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ABSTRACT

This report focuses on the more than 7 million American children who suffer from mental disorders. It was written in response to a Congressional request for development of a national plan delineating how the National Institute for Mental Health would expand basic, clinical, and services research in the area of child mental health, and also describing how the critical shortage of manpower can be addressed. These topics are discussed: (1) dimensions of mental disorders among children and adolescents; (2) causes and determinants of mental disorders; (3) interventions for child and adolescent mental disorders; (4) service delivery and systems of care; (5) the problems and needs in the field of child and adolescent mental health research and suggestions to assure that a strong research infrastructure will permit continued rapid advances; (6) research dissemination and advocacy for child and adolescent mental health; and (7) National Institute for Mental Health budget and administrative recommendations. (ABL)

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National Institute of Mental Health

National Plan for Research on Child and Adolescent Mental Disorders

A REPORT REQUESTED BY THE U.S. CONGRESS
SUBMITTED BY THE NATIONAL ADVISORY MENTAL HEALTH COUNCIL

CG022970

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Alcohol, Drug Abuse, and Mental Health Administration

U.S. DEPARTMENT OF EDUCATION
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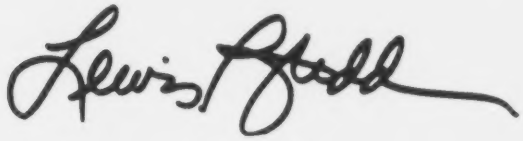
Message from the Director of the National Institute of Mental Health

This publication was produced by the National Institute of Mental Health (NIMH), the U.S. Government agency that supports and conducts research to improve the diagnosis, treatment, and prevention of mental illness. NIMH-supported studies alleviate suffering and bring hope to people who have a mental disorder, to those who are at risk of developing one, and to their families, friends, and coworkers. Thus, mental health research benefits millions of Americans and reduces the burden that mental disorders impose on society as a whole. NIMH is part of the Alcohol, Drug Abuse, and Mental Health Administration, a component of the U.S. Department of Health and Human Services.



National Plan for Research on Child and Adolescent Mental Disorders

A Report Requested by the U.S. Congress

Submitted by the National Advisory Mental Health Council

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Alcohol, Drug Abuse, and Mental Health Administration

National Institute of Mental Health
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This report was prepared by the National Advisory Mental Health Council (NAMHC) and does not necessarily reflect the scientific priorities or recommendations of the Administration. The report was submitted under section 406(g) of the Public Health Service Act, which assures that it is transmitted to Congress as submitted by the NAMHC.

Acknowledgments

In preparing this plan, the National Advisory Mental Health Council (NAMHC) has had the benefit of wise counsel and extensive assistance from many quarters. We are particularly indebted to the Institute of Medicine (IOM) of the National Academy of Sciences. At the request of the National Institute of Mental Health (NIMH), the IOM assembled an outstanding committee of scientific experts to conduct a review of the child and adolescent mental health research field--its progress, opportunities, and needs. (See Appendix A for a list of committee members.) The IOM report resulting from those deliberations, Research on Children and Adolescents with Mental, Behavioral, and Developmental Disorders, has formed the backbone of this plan. We strongly recommend a review of that report, which fleshes out and substantiates many of the points briefly highlighted in this plan.

We are indebted as well to our consultants and to members of the NAMHC Ad Hoc Advisory Group formed to assure that the research and research training priorities identified in this plan indeed represent those deemed essential by a broad sample of the field. Serving on the Advisory Group were more than 30 members of organizations with a particular concern for the mental health of children and adolescents (see Appendix B). Their contributions have helped to sharpen many issues addressed by this plan, particularly those related to the roles of mental health services research and of child and adolescent mental health advocacy and education. In addition, a special panel convened by the Research and Training Center for Children's Mental Health, Florida Mental Health Institute, University of South Florida, has provided invaluable suggestions regarding services research issues related to child and adolescent mental health.

Executive Summary

In response to a request by the Committees on Appropriations of the United States Senate and the United States House of Representatives, the National Advisory Mental Health Council submits the National Plan for Research on Child and Adolescent Mental Disorders. This plan addresses the status of research concerning mental disorders in young Americans and the steps that must be taken to free our youth of the costly, tragic burdens of mental illness.

The Problem and the Promise

Our Nation is needlessly wasting its most precious natural resource: our children and youth. We are permitting more than 12 percent of our children and adolescents--7.5 million young Americans--to suffer from mental disorders, often for life. And we are doing far too little to develop the scientific knowledge needed to treat or prevent their illness or lessen its enormous human and financial costs.

Mental disorders in our young people cost our Nation more than $1.5 billion in treatment costs each year. Yet less than one-fifth of the afflicted children now receive appropriate treatment, and many of those treated--even by the best clinicians--fail to recover because their disorders are not adequately understood. The lost lifetime productivity of these youngsters, many of whom will never work consistently or live independently, adds significantly to the costs of these disorders.

The burden of disability and misery imposed by mental disorders on young people and their families is immeasurable. Added to the child's own emotional pain is that of parents and other family members, who must cope not only with the child's illness but the possibility that the disorder may prove to be enduring.

The well-being of our Nation depends on the health and strengths of our young people. We cannot afford to let a sizeable proportion of our future workers and leaders succumb to mental disorders that severely impede their learning, wreak havoc on their mental and emotional stability, render some dangerous to themselves and others, and doom others to lives that severely tax our public and private resources instead of contributing to them. The tragic consequences of mental disorders in our youth--derailed young lives, unfulfilled potential, later drug abuse and crime, and even suicide--represent an intolerable waste of our Nation's present and future capabilities. We must do something about this situation now, and we can.

Dramatic advances have occurred in child and adolescent mental health research during the past two decades. A scientific base is now in place that has given clinicians powerful new tools for diagnosing and treating a number of the mental disorders that afflict young people. The National Institute of Mental Health (NIMH) has played a central leadership role in stimulating and supporting this progress. It has been a major force in creating and sustaining the small but excellent cadre of researchers now working in the field. These talented men and women have built an essential foundation of knowledge about how

children develop; how biological, psychological, and social forces interact to give rise to mental health or illness; and how a variety of biological and psychosocial approaches can be used to avert or treat mental disorders in young Americans.

That research has already had tangible clinical payoff for millions of youngsters who once could not be helped. Many seriously depressed young people can now, with treatment, lead normal lives largely free of illness and the threat of suicide. Research-based advances have also helped thousands of youngsters with attention-deficit hyperactivity disorder to focus on their schoolwork and manage their social relations more successfully. In addition, many anxious and terrified children--including victims of trauma and abuse--can now be helped to overcome their fears, face the day, and sleep through the night.

But these advances are not enough to aid the many youngsters whose disorders still baffle the experts and cannot now be effectively treated: Children with autism, locked in a strange and speechless world almost no one can penetrate; youngsters with behavioral disorders so severe and persistent that they seem truly bedeviled and "born for trouble"; children with Tourette's disorder, who, to their own mortification and everyone else's, are plagued by volleys of tics, squeaks, growls, and curse words they cannot suppress; and once-exemplary teenagers who, as victims of their brain's chemical derangement in schizophrenia, become ensnared in the terrifying, incoherent grip of psychosis.

Scientific effort and progress in understanding and treating the mental disorders of children and adolescents have not kept pace with the scope of the problem, the urgent need for answers and action, and the scientific field's readiness to move forward. This knowledge lag stems largely from a severe shortage of researchers. The lack of research personnel, in turn, reflects the lack of sufficient, stable funding to attract, train, and support scientists committed to careers focused on the mental disorders that afflict children and adolescents.

NIMH clearly has not been able to provide a level of support sufficient to assure the consistent growth and development of this research field. For example, although child psychiatry might appear to be a natural source of researchers in child and adolescent disorders, fewer than 20 child psychiatrists in the U.S. are full-time researchers. Other relevant disciplines also contribute less than their expected share of researchers--especially young researchers--to this field. One symptom of the lack of young recruits to mental health research is the graying of the NIMH research community. The average age of NIMH-supported researchers is 45, and that average is increasing at twice the rate of researchers supported by the National Institutes of Health.

Ironically, just when the field has the scientific power to make major advances in diagnosing, treating, and preventing some of the most daunting mental disorders that afflict our children and adolescents, it lacks the critical mass of researchers and the infusion of fresh talent, resources, and equipment needed to realize its full potential. We must invest now in the growth of this sector of the scientific community in order to exploit fully the scientific opportunities that are now available--opportunities such as these:

- Genetic factors have been implicated in schizophrenia, manic-depressive illness, autism, Tourette's disorder, obsessive-compulsive disorder, and certain learning disabilities, such as dyslexia. For example, through genetic studies of families with dyslexic members, a form of dyslexia has been found recently that is hereditary and linked to a defect on chromosome 15. By applying rapidly advancing genetic research techniques to build on such findings, it should be possible

to identify and intervene with genetically vulnerable children before they ever develop these very serious and enduring disorders.

- Brain-imaging techniques such as PET, MRI, BEAM, and SPECT scans now enable researchers to examine safely the brain's architecture, electrical activity, and metabolism in children and adolescents. These techniques have already revealed specific patterns of brain pathology in disorders such as autism and schizophrenia. Further knowledge gained through these and related techniques will enhance diagnostic precision and suggest new ways to correct abnormal brain function in children and adolescents with severe and long-lasting mental disorders.

- Persistent psychosocial adversity--such as poverty, abuse or neglect, and disturbed family relationships--increases the risk of mental disorders in children and adolescents. But some children, even from extremely adverse environments, develop well; protective factors naturally shield them from developmental harm. Further studies can be expected to yield methods for strengthening these protective factors to keep environmentally threatened children from becoming ill.

- Studies of the complex interactions between infants and their caregivers have already led to a technique for stimulating the growth of premature infants. Increasing understanding of how biological, psychological, and social factors interact as children develop is likely to lead to many more specific techniques that can be used early in life to prevent delays and impairments in young children's cognitive and social/emotional development.

- Clinicians now have an impressive array of treatments aimed at lessening the emotional pain and debilitating effects of mental disorders in children and adolescents. A variety of drug treatments, as well as "talk" and behavior therapies are already helping many young people with depression, attention-deficit hyperactivity disorder, and some anxiety disorders to lead more normal lives. Other promising new approaches are now under study for youngsters with obsessive-compulsive disorder, conduct disorder, and other types of mental illness. Further research will help to identify which approaches, used singly and in combination, are most likely to help particular individuals with such disorders. And it is likely to increase the range of treatment options for young people who cannot now be treated effectively.

- Progress in defining and identifying discrete mental disorders of childhood and adolescence is essential for accurate diagnosis in both research and clinical care, and for rational planning of mental health services. Research advances in this area have already set the stage for much-needed large-scale epidemiologic studies that will identify which groups of children and adolescents are most affected by these disorders, which disorders are most prevalent, and what kinds of services are most needed.

Our burgeoning scientific capability can now overcome many puzzling disorders that severely hamper the daily lives and the future prospects of far too many of our children and youth. But without a concerted effort to accelerate the pace of progress, it will continue to be too slow to help the millions of young people now in need and the millions more who will soon develop mental disorders we can neither prevent nor treat.

THE PLAN

Conquering the mental disorders that afflict our young people requires a focused plan of action to stimulate a rapid expansion of scientific knowledge about these disorders. The plan we propose is designed to do just that. It is intended, as well, to assure that hard-won gains from the laboratory will be more rapidly disseminated and applied to keep our youngsters well and to improve the mental

health treatments and services available to those who become ill.

To speed the day when mental disorders no longer victimize our children, we have outlined a practical strategy that focuses on three vital, immediate goals:

- stimulating a wide range of basic and clinical research at the frontiers of scientific inquiry;

- developing rewarding careers in child and adolescent mental health research; and

- providing the leadership and coordination required to sustain and accelerate the momentum of research progress and its applications in treatment and prevention.

To reach the first two goals, we recommend a 5-year phase of growth that would provide a modest, targeted increase in NIMH research and research training related to child and adolescent mental health (see Table 1 at the end of this section). To reach the third, we recommend that NIMH improve its internal coordination of child and adolescent research activities, and that it assume stronger national leadership in advocating for such research and its dissemination, in cooperation with other public and private organizations.

Our proposed plan would increase the total level of NIMH support for research and research training related to child and adolescent mental disorders from $92.3 million in FY 1990 to $283.3 million in FY 1995, with an initial increase of $60 million in FY 1991 to meet the most pressing needs and opportunities in the field. We expect these overall increases to be outweighed by the long-term benefits of this research: millions more Americans whose lives, both during their young years and as adults, are free of mental disorders and their wasteful, costly, and debilitating consequences.

Stimulating Research

We recommend that every aspect of NIMH intramural and extramural research related to child and adolescent mental disorders receive expanded support:

- clinical research focused on the epidemiology, diagnosis, treatment, and prevention of these disorders;

- basic neuroscience and behavioral research that can clarify the origins of these disorders and suggest new avenues for overcoming them; and

- clinical services research and service systems research to improve the organization, delivery, and accessibility of needed services to young people with mental disorders.

To capitalize on research opportunities ready to be exploited, we recommend for FY 1991, the first year of the plan, an NIMH child and adolescent mental health research budget (excluding research career development and training) of $136.5 million, representing a $50 million increase over such funding for FY 1990. To sustain and accelerate this research momentum, research funding should reach $257.3 million by the fifth year (FY 1995). The heavy allocation of resources to some research areas in the first year reflects our belief that they are capable of immediate, marked growth. In other areas, efforts are needed to stimulate career interest and to enhance the infrastructure to increase research capability.

Research on child and adolescent mental disorders and their origins often requires intensive collaboration among researchers from many disciplines and perspectives. To facilitate such studies, and to provide focal points for research and training excellence, NIMH should fund creation of a number of multidisciplinary research centers or program project grants devoted to key areas of child

and adolescent mental disorders research, such as the following, focused on clinical and services research:

- Research on the etiology, evaluation, and treatment of particular disorders or classes of disorder, such as schizophrenia, manic-depressive illness, conduct disorder, and autism;

- Longitudinal studies focused on the mechanisms that underlie specific risk factors and protective factors related to mental disorders, or on certain catastrophic outcomes such as suicide or homicide;

- Research on the development of valid and reliable diagnostic instruments for use in epidemiological or clinical studies;

- Efforts to develop safe and reproducible approaches to treatment of children and adolescents with mental disorders;

- Intensive exploration of community-based interventions and systems of care.

NIMH should also strongly expand support to establish program project grants or multidisciplinary research centers in the basic biological and behavioral sciences related to child and adolescent mental disorders.

To allow researchers to focus intensively on research, rather than on the search for research support, we recommend that, where appropriate, individual research grants be funded for 5 years (instead of the prevailing 3-year period). Given the importance of longitudinal research for understanding normal and abnormal child development, as well as the impact of preventive and treatment interventions, NIMH must devote special attention to creating stable mechanisms to support these very long-term studies. NIMH must also increase funding to support the modernization of research equipment and laboratories if it is to encourage child and adolescent mental health research at the forefront of current knowledge and technology.

Stimulating Research Training and Career Development of Scientists

Turning from research to research training, NIMH should make a major effort to recruit more researchers into the child and adolescent field. It must give priority to supporting well-trained, highly motivated scientists during the first decade of their careers; attrition at this stage is the most costly, and it is commonplace. NIMH should increase research training funds that target two points in an individual's career: the final 2 years of undergraduate education and the completion of graduate or professional training. Current NIMH programs for fostering early research experiences and promoting excellence are severely underfunded.

More effort is also needed to recruit more researchers from minority groups. Furthermore, a strong, coordinated effort at the Federal level should be undertaken to have child and adolescent mental health research declared a critical shortage area, similar to AIDS research, so that all or part of trainees' educational loans can be forgiven.

The FY 1990 budget for NIMH career development awards and research training related to child and adolescent mental disorders is estimated to be $6 million. To encourage the expansion of research personnel the field urgently requires, we recommend an initial increase of $10 million for a first-year (FY 1991) total of $16 million. By Year 5 (FY 1995), funding for career development and research training should increase to $39 million to assure that the field attracts and retains a steady influx of new, well-trained researchers.

Table 1
RECOMMENDED NIMH BUDGET: NATIONAL PLAN FOR RESEARCH ON CHILD AND ADOLESCENT MENTAL DISORDERS

Program	FY 1990 Current (Millions)	FY 1991 First Yr. (Millions)	FY 1992 Second Yr. (Millions)	FY 1993 Third Yr. (Millions)	FY 1994 Fourth Yr. (Millions)	FY 1995 Fifth Yr. (Millions)
I. Clinical Research	40	60	75	85	93	101
II. Basic Research	33	53	68	78	86	94
III. Research on Services	7	12	17	20	23	26
IV. Research Career Development and Research Training Support	6	16	26	31	35	39
V. NIMH Intramural Program	6	11	16	18	20	22
VI. Dissemination of Scientific Knowledge	0.3	0.5	0.7	0.9	1.1	1.3
TOTAL	$92.3	$152.5	$202.7	$232.9	$258.1	$283.3

Stimulating Advocacy and Research Dissemination

To unify the field and provide national leadership for the many NIMH research activities related to children and adolescents, an Institute-wide consortium should be created, drawn from all relevant NIMH divisions and programs. Through the consortium and other mechanisms, NIMH should enhance its national leadership in advocating child and adolescent mental health research and its dissemination. This role should include encouraging an ongoing exchange of information about research progress and needs with major public and private organizations concerned with mental health and youth. The Institute should also actively stimulate the dissemination of key research findings to the general public and to health, mental health, and other professionals who work with children and adolescents.

We share with others in the field a sense of excitement about the visible progress occurring in many areas of child and adolescent mental health research. Even more impressive gains are possible in the near future. The Nation would do well to capitalize on this momentum; the overall investment is modest, and the potential gains for our Nation are enormous; the cost of not doing so is incalculable.

PERSPECTIVE

Finally, we expect that implementation of this plan will reap benefits not only for all young people who are or may be afflicted by mental disorders, but for their families and friends, and for society as a whole. The knowledge gained by implementing this plan will complement and be enhanced by efforts now underway in another major NIMH initiative: The "National Plan for Research on Schizophrenia and the Brain" (which combines "A National Plan for Schizophrenia Research" with the neuroscience initiative known as the "Decade of the Brain" plan).

Research on the complex origins of child and adolescent mental disorders--particularly studies focusing on developmental neurobiology and the genetic control of nervous system development--is likely to clarify the biological foundations of many mental disorders that primarily affect adults, including schizophrenia. Similarly, efforts at early detection and treatment of psychopathology in young children, especially through longitudinal studies, may reveal risk factors for and predictors of disorders such as schizophrenia prior to the onset of clinical illness.

Conversely, research focused on understanding the causes and treatment of disorders found primarily among adults, such as studies being carried out through the "National Plan for Research on Schizophrenia and the Brain," will provide invaluable fundamental insights, technological advances, and treatment approaches that can be applied to research and clinical care with younger populations. Thus, we expect these two major NIMH research initiatives to have synergistic effects in attracting talented researchers to the mental health field and in stimulating new ways to understand and overcome mental disorders in people of all ages.

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Report Background

In its report accompanying the Fiscal Year 1990 bill, dated July 25, 1989, the House Committee on Appropriations requested that a national plan be developed to implement the recommendations in the Institute of Medicine's recent study Research on Children and Adolescents with Mental, Behavioral, and Developmental Disorders:

> "The Committee is...requesting that the NIMH develop a plan, using the IOM report as a starting point, delineating how the Institute would expand basic, clinical and services research in the area of child mental health, and also describing how the critical shortage of manpower which the IOM identified could be addressed. This report should be submitted to the Committee prior to the fiscal year 1991 appropriations hearings." (House Report No. 101-172, page 92)

Similarly, in the Fiscal Year 1990 report accompanying its bill, dated September 13, 1989, the Senate Committee on Appropriations stated:

> "The Committee has noted the recent Institute of Medicine study assessing the status of research on child and adolescent mental disorders. The Committee directs NIMH to request that its National Advisory Mental Health Council prepare a multi-year national plan to implement the major recommendations of the Institute of Medicine, including projected costs of such a plan...The Committee expects the Council report to be transmitted separately to the Committee in a manner consistent with section 406(g) of the Public Health Service Act prior to presentation of the 1991 budget request." (Senate Report 101-127, page 175)

The following National Plan for Research on Child and Adolescent Mental Disorders, developed by the National Advisory Mental Health Council, is submitted as a report covered under section 406(g) of the Public Health Service Act in response to these directives.

Prologue

This is a report about our Nation's children. Boys and girls in every part of the country, of every race, religion, and social class. Infants, toddlers, schoolchildren, teens. But it is not about all young people. It concerns the unfortunate millions--7.5 million or more--who suffer from mental disorders. Perhaps the child of a neighbor or friend, your niece or nephew or grandchild. Possibly one of your own children. These are the youngsters who are troubled and troubling. Hurt and hurting. Disturbed and disturbing. Children who are hard to handle, hard to raise. And some who suffer so silently and secretly that no one recognizes their pain until they're gone--runaways, or even worse, suicides or young victims of drug overdoses.

Why do some youngsters become severe problems to themselves and others? Why does their development go awry? Why do some bounce back from their difficulties while others spiral into a whirlpool of trouble until they're locked up? What can be done to prevent or lessen the burden of mental disorders on our young people and our society? We urgently need answers to these questions so we can help the millions of youngsters who are already ill and spare millions more--and their families--their pain.

Professionals who work to prevent and treat mental disorders in children and adolescents have never been better equipped for the task. Their help can often spell the difference between a young life permanently derailed and one that is headed for recovery and productive adulthood. But some clinicians are unfamiliar with the research advances that could strengthen their ability to help. And even in the hands of the best and best-informed clinicians, some youngsters will not recover. Too little is known about their illness. They can be helped, but not enough to redirect a troubled course.

To change this situation, we need research. We need to unleash the enormous power of our country's scientific capabilities and put it to work on behalf of our youth. Research can reveal what goes wrong and how to prevent or correct it. Children and adolescents are complex, and so are their problems. Biology often sets the stage for trouble, as brain cells develop or function abnormally. We need research to understand how this happens and how to set things right. But the young person's environment plays a role as well. Family, neighborhood, schools, friends--all can lead vulnerable children and adolescents astray, or give them the strength to grow up well. We need research to understand how to enhance these strengths.

To carry out research we need researchers--talented men and women willing and able to devote a lifetime to solving these problems. At present, far too few are committed to such studies. We must find ways to attract them, equip them with the knowledge and technology to place them at the forefront of science, and keep them devoted to the task of understanding the mental disorders that make our young people ill.

We who serve on the National Advisory Mental Health Council--scientists and lay members alike--do so because we believe the

Federal Government has an important role to play in conquering mental disorders in our Nation. We welcome the opportunity to advise the Congress about an important opportunity to strengthen the mental health of our children and our country.

In the past 20 years, the American people have invested $3.9 billion in research funded by the National Institute of Mental Health (NIMH). That investment has paid off handsomely. For example, during that same 20-year period, just one of the many treatments NIMH funding has helped to assess and refine has saved the Nation an estimated $39 billion in lost productivity. That treatment--lithium--has helped millions of adults with manic-depressive illness, and it may have additional therapeutic payoff for many children and adolescents with mental disorders. But much more research is needed to discover how much and how well lithium and many other promising treatments for young victims of mental disorders can actually help them.

Much of that needed research, if it occurs at all, is likely to be funded by NIMH, the major source of support for research on child and adolescent mental disorders in the U.S. NIMH also supports essential research on serious disorders such as Alzheimer's disease and others that primarily affect adults. We are concerned that, in the face of competing demands for limited Federal funding, NIMH research on child and adolescent mental disorders will be shortchanged--as it has been in the past. Of equal concern is the possibility that other high-priority NIMH programs and initiatives will be forfeited or abridged in the interest of supporting child research. This must not happen. Improving the mental health of the Nation requires a balanced, intensive research effort addressed to the needs of all citizens afflicted or threatened by mental disorders.

The 5-year national plan we propose outlines a strategy to accelerate progress in understanding child and adolescent mental disorders. It describes the enormous challenge before us: what we know, what we need to know, and what it will take--through an infusion of much-needed resources--to close the gap. Putting that plan into action will require a modest and targeted increase in NIMH funding for research related to child and adolescent mental disorders, while still increasing in overall NIMH funding to continue current initiatives.

If the American people and the policy-makers representing them truly comprehend what our Nation stands to gain from improving the lives of more than 7.5 million of our young people, we will find the means to transform these words into deeds. We therefore submit our plan in the hope that it will hasten the day when no child or adolescent need be too hard to handle, too sad to survive, too strange and angry to live among us, too ill to laugh, play, and love.

Section 1

Dimensions of Disorder

Bridget was a gifted child. She was bright, witty, and talented, the crown jewel of her bleak, inner-city neighborhood. Then, shortly after her 16th birthday, Bridget lost her sparkle. She showed up in a hospital emergency room after cutting her wrists with a razor blade.

During the hospital interview, Bridget was withdrawn and downcast. She cried quietly and nervously avoided eye contact with the interviewer. Bridget said that she had been feeling miserable and hopeless for about the past 2 months. She lost her ability to concentrate in school, and her grades dropped from A's and B's to C's and D's. She stopped calling her friends, and showed no interest in her piano lessons despite her aspiration to be a musician.

"Mom and Dad are both alcoholics," she explained, "like Grandpa and two of my uncles. My folks split when I was three, and since then I've been living with Mom and Chuck, my stepfather. He's an alcoholic, too. He used to beat Mom when he got drunk, but he never beat me. Now Mom and I live at Hope House, the downtown shelter for battered women, so he's less of a problem for us."

Two weeks before her suicide attempt, Bridget quit school, saying that she had neither the energy nor the interest to continue. She stopped eating regularly, lost weight, and began having difficulty sleeping. Then she began thinking frequently of suicide, believing that her family would be better off without her.

"Life was always hard, but never this hard," she said during her interview. "I used to believe I'd be somebody someday, but now there's nothing ahead. I'll never finish school or get a good job."

Depressive disorders, such as Bridget's clinical depression, can occur in younger children but are much more common in adolescents. Unfortunately, many children and adolescents with clinical depression are not diagnosed as suffering from a mental disorder until a serious complication, such a suicide attempt, makes their pain all too visible. By then, for many such youngsters, it is too late to help.

Bridget was lucky. She was put on antidepressant medication and began twice-weekly psychotherapy sessions. Five weeks after her suicide attempt, most of her depressive symptoms were gone. She went back to school, returned to her piano lessons, and was preparing for her first performance with the school orchestra. Although Bridget's course of treatment is far from completed, her doctor is cautiously optimistic about the eventual outcome.

A decade ago, the outlook for Bridget and youngsters like her was bleak. She might have been seen as just another moody teenager. If she did show up for treatment, the necessary medication and psychotherapy might not have been available. If she did not eventually take her own life, she might have been doomed to a life severely handicapped by depression.

Today, because of impressive research advances in the mental health field, many youngsters like Bridget are alive, back on track, and

likely to stay that way. But they are the lucky ones whose disorders can now be effectively treated. Many other children and adolescents, numbering in the millions, have mental disorders, developmental problems, and behavioral problems that still baffle the best of clinicians and researchers. Much remains to be learned if we are to help them overcome their disorders and grow up to fulfill their potential. More needs to be known about the causes of mental disorders in children and adolescents and about effective ways of treating and preventing them.

In most normal children, the vast array of genetic, neurochemical, physiological, psychological, and social processes of development follow a well-laid plan that transforms them from curious infants into competent adults. But for too many, like Bridget, development goes awry. This report is about such children and the field of child and adolescent mental health research, which examines the emotional, behavioral, and developmental disorders of infants, children, and adolescents. It documents the progress that has been made in understanding, preventing, and treating such disorders, highlights many of the promising opportunities for future research, and sets forth critical requirements for advancing the field.

THE SIZE AND SCOPE OF THE PROBLEM

How many children and adolescents in the U.S. have mental disorders? This fundamental question does not yet have a definitive answer. Recent studies suggest that between 17 and 22 percent (or 11 to 14 million children) suffer from some type of diagnosable mental disorder. But even the most conservative estimate is that 12 percent of the 63 million young people in this country under the age of 18 suffer from clinical maladjustment. Of these 7.5 million youngsters, nearly half are presumed to be severely handicapped by their mental disorder. And even in less severe cases, a child or adolescent may have difficulty coping with the demands of school, family, and community life.

The mental disorders seen in children and adolescents vary in the age at which they first appear, the types of symptoms and levels of impairment they produce, and the long-term effects they have on youngsters' development. Such disorders include emotional disturbances, such as depression and crippling states of anxiety; behavioral problems characterized by disruptive and antisocial acts; and developmental impairments that limit a child's ability to think, learn, form social attachments, or communicate effectively with others.

These categories are not mutually exclusive--in fact, many young victims have two or more mental disorders. Autism and severe mental retardation, for example, are often seen in the same child, as are conduct disorder and attention-deficit hyperactivity disorder, and major depression and alcohol abuse. This "comorbidity" can seriously complicate the lives of youngsters with mental disorders as well as the diagnosis and treatment of their illness.

The long-term outcomes for children and adolescents with mental disorders, such as that of the depressed Bridget, are not well known. It is clear, however, that although many parents believe their children will simply "outgrow" their mental or behavioral problems, the adverse effects of many untreated disorders of childhood and adolescence last into adulthood.

Recent research suggests that untreated depression in childhood and early adolescence often leads to chronic difficulties in the teenage years and, especially in girls, may lead to adult depression. There is also good evidence that anxiety disorders, which often begin at around the age of 15, persist through adolescence and on into adulthood if untreated. Autism begins early in life and usually results in a lifetime of markedly impaired mental

and social functioning, and almost half of all youngsters with conduct disorder become antisocial adults.

THE COSTS OF CHILD AND ADOLESCENT MENTAL DISORDERS

Mental disorders lead to an enormous amount of suffering for afflicted children and adolescents and their families, and they impose a costly burden on society. Because of the millions of youngsters involved, the direct costs--which include mental health treatment, health services, special education, juvenile justice, and child welfare--are enormous.

Little research has been done on the actual costs of treating the mental disorders of childhood and adolescence. One recent study estimated that the direct cost of treatment for mental illness in 1985 was $35 billion, with at least $1.5 billion of that being spent on children under the age of 15. And that is probably a gross underestimation.

In an effort to compare the treatment costs of children's mental disorders and physical disorders, the Institute of Medicine of the National Academy of Sciences commissioned a study of children who were dependents of employees of a large manufacturing company. Based on insurance data from 1984 through 1986, the study showed that of $16.7 million spent on hospital care for children, $2.7 million (16 percent) was spent on mental disorders. In addition, of $4.9 million spent on outpatient care for children, about $1 million (23 percent) was spent on mental disorders.

These figures, too, underestimate the true costs. Many children and adolescents with mental disorders are hospitalized longer or have more outpatient visits than their family's health insurance will cover. And the insurance data do not include the enormous amount of outpatient care provided by non-physicians, such as independently practicing psychologists and social workers.

Numerous other costs also contribute significantly to the financial burden imposed by child and adolescent mental disorders. Social systems, such as the educational, child welfare, and juvenile justice systems, provide many services for young people with a variety of behavioral problems and mental disorders. Considering the number of young people within these systems, these services add substantially to the social costs of child and adolescent mental disorder.

During the 1986-87 school year, for example, 384,680 youngsters with serious emotional disorders were receiving special educational and related services. The average cost per student ranged from $4,500 (in self-contained special education classes) to $6,204 (in private school placements paid by public education funds).

In 1985, more than 49,000 young people were held by the justice system in juvenile facilities--with many thousands more in adult facilities. As many as half of these juveniles are estimated to have at least one mental disorder. The average annual cost of care of an incarcerated juvenile ranged from $15,200 to $66,100 in 1984, depending on the State. Since a significant number of youths with serious emotional or behavioral problems end up in the juvenile justice system, these expenses are an important part of the social costs of child and adolescent mental disorders.

The U.S. Office of Technology Assessment estimates that only about 2 million of the 7.5 million children who need mental health treatment receive it. Many of the untreated youngsters will develop into seriously mentally ill adults who, if still untreated, may have difficulties holding jobs and becoming contributing members of society. Their lost productivity is a major cost to society.

For families, the financial and emotional costs of a child's mental disorder can be overwhelming. In the case of conduct disorder, autism, and other severe disorders, for example, a potential wage earner may have to stay home and care for the troubled child or adolescent, and insurance may offer little help. One study found that despite the severity of autism, children with this chronic disorder, which may require years of institutional or home care, are less likely than other children to be covered by private health insurance. Even for those insured, coverage is extremely limited.

Beyond the financial costs to our society is the staggering emotional cost of severe mental disorders on individual young people and their families. Parents often bear a profound--albeit undeserved--burden of guilt. Other children in the family may find many of their own needs unmet as parents struggle to deal with the ill child. And that ill child, often aware that he or she is "different" from other children, suffers not only from the disorder but from its added social repercussions. These and other emotional costs are incalculable.

Research on the Epidemiology of Child and Adolescent Mental Disorders

Any systematic national effort to understand and conquer mental disorders in children or adults must be based on a firm understanding of the scope of the problem: How many people have these disorders? Which disorders are most prevalent? How are they distributed in the population--by age, geographical area, social class, and other important social characteristics? How many people with these disorders receive the services they need? Knowing these basic facts can guide policy makers in setting priorities for mental health research and services and in marshaling needed resources locally, regionally, or nationally.

Obtaining such information requires agreement among mental health professionals about how to classify such disorders and what criteria and assessment tools to use in determining which individuals have specific disorders. Until quite recently, these issues, among others, were sufficiently thorny to prevent the development of reliable national epidemiologic data on the prevalence of mental disorders in any segment of the population. However, within the past decade, advances in diagnosis and classification have made it possible to overcome many of the problems that had hampered past studies.

Using multi-site community-based surveys, the NIMH-sponsored Epidemiologic Catchment Area (ECA) program has at last provided a reliable portrait of specific mental disorders in the United States population. The success of this program has gone far beyond expectations. Beyond producing precise estimates of the prevalence of specific mental disorders for various geographic areas, it has also had a major impact on the development of classification schemes and methods of diagnosing mental disorders throughout the world.

But this landmark project only addresses mental disorders in the adult population 18 years old and above. Comparable progress has not yet been made in describing the national prevalence of specific mental disorders in children and adolescents, although clearly such data are urgently needed.

The reasons for this knowledge gap are many. A shortage of researchers in the child and adolescent mental health area has contributed to an overall lag in research-based knowledge relative to what is known about adult disorders. Until a critical mass of research knowledge has been reached, it is difficult to establish an adequate scientific foundation for classifying disorders. At present, the appropriate classification of child and adolescent mental disorders, as well as the diagnostic criteria and assessment tools appropriate

for use with young children, are still in dispute in many quarters.

In addition, the nature of child development itself raises special difficulties not encountered in the study of adult disorders. Adults can provide subjective information about their condition that is an invaluable aid to diagnosis. But many very young children are too immature to articulate their feelings, and the reports of people familiar with a child's behavior--such as parents, teachers, and clinicians--often conflict. Furthermore, because there is great variability among children and adolescents in their pace of development, it is difficult to establish the boundaries of age-appropriate behavior to determine what is normal or abnormal for a child of a given age. An additional complication is the fact that as young people develop, they may spontaneously outgrow some types of problem behavior or adopt different ways of expressing an enduring problem.

A more adequate classification system for child and adolescent disorders is clearly necessary if researchers are to continue to make advances in understanding, diagnosing, and treating child and adolescent mental disorders. The system must be reliable enough to permit different investigators to assign young people with the same disorder to the same diagnostic category; scientific communication about these conditions is otherwise impossible. In addition, the system must be valid. Each disorder category should be discrete, and should provide information not only about symptoms but about the disorder's cause, natural history, and responses to treatment.

Two general approaches are currently being taken to the classification of mental disorders seen in children and adolescents. One is based on clinicians' judgments about what groups of symptoms constitute specific disorders. The other is based on analyses of data on large samples of children and adolescents receiving care. Neither system is wholly adequate. Some diagnostic groupings are well established and useful, while data on others are lacking.

Notwithstanding these difficulties, there has been notable recent progress in developing the research underpinnings necessary for an epidemiologic description of child and adolescent mental disorders. NIMH has already taken significant steps in this direction. For example, it has supported the development and refinement of the NIMH Diagnostic Interview Schedule for Children (DISC), a highly structured psychiatric assessment intended for use in epidemiologic surveys of children's mental health.

In FY 1989 NIMH initiated the first phase of an effort to develop procedures for use in a multi-site epidemiologic and services study of mental disorders among children and adolescents ages 9 through 17. During the first year of this 3-year program, researchers in several sites will pilot test their own assessment batteries and procedures. Based on results of these pilot studies, the collaborators will develop a Common Core Battery and other survey procedures, which will be used across sites in a larger scale field trial. The Common Core Battery will include a structured psychiatric interview, a measure of impairment, a section gathering data on use of services, and an assessment of demographic, psychosocial, and behavioral risk factors for mental disorders. Of the 14 applications received in response to the announcement of this new initiative, 4 sites have been selected and funded. However, efforts such as these need to be intensified and expanded, as the following research recommendations suggest.

RESEARCH RECOMMENDATIONS

Continuing research on the classification and assessment of childhood mental disorders is needed in order to clarify the exact nature and size of the problem. Three measurement

problems require immediate attention: 1) lack of knowledge about factors that influence the judgments of clinicians and others about emotional and behavior problems in children; 2) low agreement among informants, such as parents, teachers, and children; and 3) the inherent difficulties associated with assessing young children.

Specific attention is needed to the variables affecting informants' responses about the child or adolescent. For example, to what extent does mental illness in parents affect their descriptions of their children's behavior? Parents with mental disorders such as depression, for example, tend to report higher levels of psychopathology in their children than do well parents. Are they simply more in tune with their children's mood changes than other parents? We also need to know why fathers tend to report less disorder than do mothers, and why parents are usually poor at describing their own behavior, especially parenting behavior. Awareness of these factors is essential for selecting or developing assessment tools, and research in this area needs to be encouraged. Strategies have been devised for dealing with these problems, but considerably more research is needed in this area.

A number of disorders that are first evident during early childhood (under age 10) present special assessment challenges. Because children have limited cognitive and language abilities until about age 7 or 8, young children cannot reliably report their self-perceptions, memories, feelings, and behavior. This issue must be examined further, with priority given to measurement research that will allow investigators to obtain and code--systematically and reliably--subjective information directly from younger children. Direct measurement of the mental status of young children should not be written off as beyond our current technology. However, the task of developing a reliable methodology remains.

NIMH is taking appropriate steps toward the development of a multi-site epidemiological study of children's mental disorders. That study will provide essential information on service needs and ensure wider recognition of the importance of the field of children's mental disorders. Several challenges must be met in these preliminary studies, however, including improvement of methodology (as mentioned above). But the most important is case identification, in which two critical questions remain unanswered: To what extent do children and adolescents identified in community surveys represent true clinical cases? To what degree would identified children and adolescents or their parents accept services if they were offered? Implicit in both questions is the extent of agreement between research-driven definitions of mental disorder and the perceptions of illness held by parents, teachers, and youngsters themselves.

Other issues that need to be addressed include the relationship between symptoms and impairment. Some young people have multiple symptoms and minimal impairment while others with few symptoms are significantly impaired. There are also questions about the duration of certain disorders. At present it is often difficult to predict when a disorder will persist or when it will remit spontaneously.

The NIMH preparatory studies should be followed by small-scale community prevalence studies, conducted in several locations throughout the country. Such an approach is useful in developing the methods and procedures needed for a large-scale multi-site study; efforts such as these should be expanded.

To advance knowledge and training related to the epidemiology of child and adolescent disorders, NIMH should consider establishing one or more research centers in child psychiatric epidemiology. At such centers, issues related to the scope and magnitude of mental

disorders in children and adolescents could be addressed from a public health perspective. The research centers could sponsor studies on a variety of problems, including comparisons of different classification schemes, development and field testing of new assessment methodologies, and prevalence and incidence studies of mental disorders in special populations (such as youngsters in foster care and those exposed to catastrophic events with community-wide impact). Such centers might also become sites for preparing and conducting a large-scale, multi-site, community prevalence study.

Research recommendations addressed to the need for more reliable data on the costs of mental disorders affecting children and adolescents are discussed in Section 4.

Section 2

Causes and Determinants

John, a 5-year-old, has just been referred to a child psychiatrist because he does not speak very much or very well and cannot get along with other children. He did not begin to speak until he was three, and even now his vocabulary is limited to only about 200 words. Most of what he does say consists of repetitive phrases he heard on television, or simple request or demands. He cannot initiate or sustain a conversation with other children or adults, and his mother describes him as "living in a shell."

John also has a number of unusual behaviors and interests. He is fascinated with water and often spends long periods of time intently watching water dripping into a basin. John shows no interest in playing with toys as other children do; he prefers to arrange objects in a straight line or talk jargon to himself while rocking back and forth. Although children's shows on television hold no appeal for him, he likes to watch adult game shows. John becomes very upset when furniture is moved around the house, and he was inconsolable when his parents replaced the old family car with a new one.

John's nursery school teacher says he has an amazing facility with numbers and letters, but she is concerned because he would rather stay by himself than play with other children. He communicates little with his teacher and seems odd and aloof. Echoing his mother, she describes him as "in his own world."

When John was three, his mother was told by the family doctor that John probably would outgrow these problems. But John never developed a loving relationship with her, and she now senses, quite correctly, that he is suffering from a severe and chronic condition.

John has autism, a disorder that begins early in life and distorts many aspects of development. Afflicted children, such as John, are unable to establish normal ties of affection to their parents, however loving their parents may be. Children with autism also respond in unusual or bizarre ways to the environment: They resist change, show too little or too much sensitivity to all kinds of environmental input, and have catastrophic reactions to everyday occurrences. Their language development is severely impaired; like John, many either fail to develop speech or have peculiar speech patterns. Many children with this disorder also make repeated ritualistic movements and twist their bodies into unusual postures.

Children with autism usually have a number of other serious problems. Approximately three-quarters of them are mentally retarded, and about one-quarter develop seizure disorders, especially in adolescence. In adulthood, at least two-thirds of people with autism require fully structured environments with round-the-clock supervision, and only a very few "high functioning" individuals are capable of anything close to independent living as adults.

Childhood autism was once thought to be a result of abnormal parenting, but a great deal of research in recent years--especially genetic and brain-imaging studies--suggests that autism and related disorders are primarily

biological in origin. There is evidence from imaging studies, for example, that a specific part of the brain, the cerebellar vermis, is underdeveloped in some autistic individuals.

Research into the causes of autism is redirecting the search for effective treatments. Various behavioral techniques can be applied to some of John's symptoms, and some medications may also prove helpful. However, little that can now be done for John is likely to transform him into a normal child. Given our current state of knowledge, most children with autism remain severely impaired for life. If the burden of suffering of such children and their families is to be diminished, and if progress is to be made in reducing the toll of severe mental disorders such as autism, much more will have to be learned about their causes.

Given the remarkable changes that take place between birth and maturity, it is not surprising that a great deal of fruitful research now exploring the causes of child and adolescent mental disorders relies on the developmental perspective, which is described below.

THE DEVELOPMENTAL PERSPECTIVE

Understanding how children develop--and how that process can go awry in some children to produce mental disorder--requires a very broad, multidisciplinary perspective. Such research must tease apart a complex web of biological, psychological, and social interactions from prenatal life through young adulthood. The influence of biological (including genetic) factors in the unfolding of normal and abnormal behavior and maturation is gaining increased recognition, spurred by rapid technological advances in the biological sciences (including neuroscience). But research also clearly shows that environmental influences--including the family and broader social environment--are powerful in their own right, and can help or hinder children and adolescents as they cope with and adapt to the changing expressions of their biological endowment over time.

Much of today's research into the causes of mental disorders of children is based on the assumption that many disorders reflect deviations from the normal path of development. Many scientists have assumed, for example, that the age of onset of certain serious mental disorders is related in some way to the maturation of the brain. Exciting work in neurobiology is now confirming this. Studies are revealing that different neurotransmitters--the brain's chemical messengers--are activated at different stages of development. The brain's norepinephrine and serotonin systems, which are implicated in mood states, develop early in life. The dopamine system, which is implicated in psychotic conditions, such as schizophrenia, develops much more gradually and does not mature until the late teen years. The different rates of development of various brain systems may be related to the different ages at which the symptoms of major mental disorders appear, and may offer clues to the causes of these disorders.

In adult rats, for example, destruction of brain pathways that use the neurotransmitter dopamine results in profound inactivity. But in newborn rats, destruction of the same pathways has the opposite effect: hyperactivity. When these same animals are given stimulants, the adults become more active while the newborns become calmer. Since dopamine is implicated in attention-deficit hyperactivity disorder, Tourette's disorder, and schizophrenia, studies of its action at different stages of development are likely to shed light on the biological origins of these mental disorders of children and adolescents.

Other lines of neurobiological research are outlining how neurotransmitters affect the brain's early differentiation and growth, as well as the molecular mechanisms that account for the environment's effects on brain circuitry and function. The very neurotrans-

mitter systems that regulate these developmental processes appear to be involved in other important functions, such as emotion, cognition, and the regulation of sleep. Further research may lead to better understanding of such developmental disorders as bedwetting and night terrors. It may explain, as well, the significance of the disturbed sleep patterns seen in certain mental disorders, such as depression.

The causes of mental disorders in children and adolescents are also being clarified by studies of sensitive periods in development. Sensitive periods are those when a young child is particularly vulnerable to such events as sensory deprivation, emotional deprivation, malnutrition, or exposure to toxins. Research has shown that young cats deprived of visual stimulation, for example, fail to develop neural circuits necessary for vision. Young monkeys reared without mothers develop problems in communication and social adaptation. And institutionalized infants deprived of individual attention and stimulation may grow up to be physically, psychologically, and intellectually retarded.

Such studies are beginning to identify conditions that may help to overcome the effects of early deprivation. These and other studies that relate sensitive periods to risk factors and to protective factors may point to ways to interrupt or prevent abnormal processes in a variety of disorders.

Developmental research also focuses on the importance of parents, peers, and social and economic factors in the emergence of symptoms in children. Severe parental discord, for instance, is often a precursor of adolescent disorders, especially conduct disorder and later antisocial personality disorders. Future studies could design and evaluate prevention programs aimed at reducing marital discord, helping parents recognize abnormal behavior in their children (particularly during adolescence), strengthening parenting skills, and expanding and improving the available pool of foster and adoptive families.

A youngster's playmates and friends are important influences on social development. Their powerful socializing effects are evident as early as 1 year of age and peak during adolescence, when teenagers spend nearly one-third of their time with their friends. Peer-group relationships become especially potent when young people lack strong family ties and spend extensive time with their peers. If their peers are delinquent, the alienated but nondelinquent children, too, may develop criminal tendencies. Research has confirmed, however, that the untoward influence of deviant peers can be greatly neutralized if children are given opportunities for meaningful social relationships with nondelinquent peers.

Poverty, too, is powerfully linked with behavioral disorders in young people. When poverty is severe, children are, too frequently, born prematurely or with low birth weights; have inadequate nutrition, health care, or housing; or lack parental supervision and support. During times of economic distress, parents and children may experience high stress, anxiety, or depression. All of these factors contribute to behavioral problems and disorders.

A great many social and economic factors merit study to understand better the causes of mental disorders in children and adolescents and to identify more effective means of preventing them. The childrearing practices of parents, the relationships of children with siblings and peers, the functioning of school systems and of child care facilities, and the impact of severe economic disadvantage are but a few of the major social and environmental variables that require more systematic and intensive research. During the past two decades, considerable progress has been made in developing techniques for measuring and

analyzing these important influences on child development, but much remains to be done.

THE MULTIDISCIPLINARY APPROACH: LEAD AREAS OF PROGRESS

Understanding and addressing fully the range of mental disorders of children and adolescents described in this plan will depend ultimately on our capacity to understand how biological, psychological, and social factors interact with one another, and how, together, they affect behavior. It greatly simplifies research to narrow the focus of studies to only a few factors of greatest interest to particular disciplines. However, studies only tell part of the story when they examine solely the behavioral impact of brain structures and activities, or the behavioral effects of psychological or social/cultural factors. In reality, none of these factors operates in isolation.

If we are to account for how mental disorders develop and emerge in children and adolescents, or how they persist and change over time, we need studies that examine the complex question of how biological and psychological processes combine with one another and with the socio-cultural environment to affect behavior and health. Thus, answers to questions about the causes of child and adolescent mental disorders will have to come from researchers in a variety of disciplines who work together to focus on a common problem or clinical disorder.

Several areas of multidisciplinary research, described below, have been moving rapidly in recent years and are generating exciting new perspectives on the causes and determinants of childhood mental disorders. In many instances, the combination of psychological and biological perspectives has been particularly fruitful, as the following examples illustrate.

Research on learning difficulties, such as dyslexia, has revealed that some of these problems cluster in families. Through genetic studies of families with dyslexic members, a form of dyslexia has been found recently that is hereditary and linked to a defect on chromosome 15. By studying individuals with this familial form of dyslexia, researchers can examine the cognitive deficit or deficits involved in dyslexia in a relatively homogeneous population--a prerequisite for systematic research. Furthermore, as in the case of other cognitive disorders, such as Down syndrome, the identification of a subtype of dyslexia known to stem from a particular genetic flaw may lead to new avenues for prevention.

Recent developments in behavioral genetics, due in part to advances in computers and blood analysis procedures, have led to findings that suggest there are relationships among many types of disorders seen in childhood and adolescence. For example, both genetic marker and gene segregation studies indicate that Tourette's disorder, dyslexia, and various forms of hyperactivity may all be closely related to one another because the genes involved in their expression appear to lie in closely related chromosomal sites. These findings are direct outgrowths of collaborative work among researchers in behavioral genetics, computer scientists, and field workers who collect extensive cross-generational family histories and blood samples from all the living generations in families affected by these disorders.

Another exciting interdisciplinary research area is exploring how the early growth of the brain is related to the emergence of cognitive functions in young children. For example, one group of researchers is studying how maturation of the frontal lobe--which underlies many of the highest mental processes, such as planning and reasoning--is related to cognitive functioning in the first years of life. This work promises to clarify how the frontal lobe develops during these early, formative years, and how rates of tissue growth are

related to behavioral function. It also examines growth curves as predictors and indicators of possible disorder and as markers of central nervous system integrity. Such studies may aid in the early identification and treatment of children at risk for serious impairments of thought processes.

Studies in the "hybrid" area bridging cognitive psychology and neuropsychology represent a type of research that did not grow out of either field working independently. Collaborative efforts across laboratories and specialty areas have been a necessity, in part because of the lack of a critical mass of researchers in a single laboratory and because of the high costs of research equipment. One study in this hybrid area, which is examining the link between memory and brain function, has required collaboration among seven facilities.

The technology is now available to follow up on promising leads such as these. However, limited funds to sustain such high-cost research, to provide the sophisticated equipment it requires, and to train behavioral scientists to keep pace with these technological advances have slowed the rate of progress in these key multidisciplinary research areas and those described below.

The Psychobiology of Parent-Child Interactions

During the first years of life, when the largely helpless infant depends on its parents for survival, parent-child interactions are crucial. Two psychobiological factors--temperament and attachment--have been found to be central to infants' social and emotional development. "Temperament" refers to individual differences in early emotionality, activity, arousal, and similar characteristics apparently influenced by genetic factors. "Attachment" refers to the emotional bond that develops between infants and their most significant caregivers.

Important research findings suggest a possible link between certain temperaments and later developmental problems. Being prone to anger, for instance, may predict later aggressiveness. Researchers have identified an enduring pattern of behavioral inhibition and shyness that, for some children, may be a risk factor for later mental disorders. Others have also found suggestive links between early temperament and childhood behavioral disorders.

However, the crucial research that will integrate temperament with other risk factors largely remains to be done. Understanding how and why specific temperamental characteristics might predict the development of mental disorders may lead to new intervention strategies to help protect children at risk.

The affectionate bond of attachment between infants and their caregivers is essential for infants' safety and survival. Through it, infants learn the necessary skills for dealing competently in their environment. Approximately 70 percent of all infants form a secure relationship with their primary caretaker, but the others are either markedly detached or are excessively dependent.

Innate differences among children may play a role in the formation of attachment, but the quality of the bond appears to be enhanced by sensitive, responsive caregiving. Conversely, insecure attachments are linked to caregiving that is emotionally and physically distant and unresponsive. A number of studies have shown, for instance, that children who have been abused or neglected almost always form insecure attachments with their primary caregivers, as do children whose parents have mood disorders, such as depression.

In an especially exciting study, one linking animal and human research, a team of researchers has shown that attachment, in the form of close physical contact, is even important to newborns' physical development. They

demonstrated that infant rats separated from their mothers secrete less growth hormone and therefore are smaller than those who remain with their mothers. The separated infants, although well fed, lack the opportunity to be groomed and licked by their mothers--an act which, the researchers discovered, stimulates the release of growth hormone in the infants.

When the researchers extended their study to premature infants--who are also deprived of normal physical stimulation by being kept in isolettes during the first few weeks of life--they made an important discovery: "Premies" who were massaged periodically gained more weight than premies given only standard care and routine stimulation.

Role of Risk Factors and Protective Factors

Why do some children and adolescents in stressful environments do well while others develop mental and behavioral disorders? Research aimed at answering this question is identifying the factors that can spell the difference between healthy, adaptive development and disorder. Such studies may lead to the development of strategies for protecting youngsters at risk.

For example, a study of mental disorders in children living in two quite different geographic areas--the Isle of Wight and an inner borough of London--has helped to clarify how environmental risk factors increase children's chances of becoming mentally ill. The researchers found six risk factors within the family environment that were correlated significantly with childhood disturbance: 1) severe marital discord; 2) low social status; 3) overcrowding or large family size; 4) parental criminality; 5) maternal mental disorder; and 6) placement of a child in foster care. The probability of mental illness symptoms in children increased progressively with the number of these risk factors within the family. The presence of a single risk factor in a family did not significantly increase the rate of symptoms in their children, but with two risk factors, the chances of mental illness symptoms increased fourfold, and with four risk factors, there was a tenfold increase.

An extension of this study revealed that, even when raised in extremely adverse circumstances, some children do not become mentally ill because specific environmental factors protect them. Among children living with their parents in a household emotionally torn by serious marital discord, 75 percent of children who had a negative relationship with both parents had symptoms of mental illness. But among those who had a loving relationship with one of the parents, only 24 percent had such symptoms. In another study, these researchers found that the rate of conduct disorder was 2 1/2 times greater among children who lived in homes marked by hostility than among similar children placed in more supportive foster homes.

To summarize a large body of research, the many factors that place some young people at risk for mental and behavioral disorders include the following:

- genetic factors, which increase a child's vulnerability to autism, affective and anxiety disorders, Tourette's disorder, and attentional and learning disorders;

- biological "insults," such as physical trauma or exposure to toxic chemicals or drugs;

- poor prenatal care, which leads to increased risk of premature birth and a host of related problems;

- chronic physical illness, such as leukemia, diabetes mellitus, asthma, cystic fibrosis, epilepsy, and AIDS;

- cognitive impairments, such as those resulting from mental retardation, as well as

deficits in sensory perception, including deafness and blindness;

- persistent psychological adversity, such as poverty, disorganized and inadequate schooling, and homelessness;

- child abuse or neglect;

- disturbed family relationships; and

- parental mental illness, with the potentially dangerous combination of psychologically traumatic disruptions of family life and inconsistent parenting.

Many of these risk factors themselves can be altered, and even when they cannot, protective factors can be enhanced to lessen children's chances of becoming ill. Research exploring these important avenues for prevention is described in Section 3.

Animal Models

Animals play a vital role in our attempts to understand mental disorders in humans. Research with nonhuman primates is particularly relevant because of their close relationship to humans and their complex capacities for cognition, feeling, and social interactions. Through studies of individual differences among animals of the same species, coupled with comparative research on related species of primates, researchers can disentangle the roles of genetic and environmental factors that cannot be readily studied in humans. Similarly, studies of nonhuman primates can clarify the relationship between nervous system maturation and behavior. Given these advantages, and the fact that nonhuman primates mature more rapidly than humans, the study of the development of nonhuman primates is an essential tool for understanding the causes of mental disorders in children and adolescents.

One researcher, for example, has found heritable patterns of such primate behavior as shyness and anxiety in the young, which may be linked to disturbances of chemical functioning in the brain. The possible linkages between these findings in animals and the research described earlier on temperamental shyness in children are being explored.

Like humans, nonhuman primate infants have a prolonged dependent period and generally have very strong emotional ties to their primary and secondary caregivers. Studies of the factors governing attachment processes in both infants and their mothers--bonds that are central to both normal and disordered human development--play a major role in guiding the study of human emotional and social development.

Because nonhuman primates have relatively sophisticated cognitive capacities, they are also used in studies of complex social and nonsocial information processing. Investigators can study important functions such as learning, memory, social discrimination, problem solving, and even many complex processes of language acquisition.

Developmental Cognitive Psychology

Through developmental cognitive research, scientists are studying the intricate processes and mechanisms that develop over time into higher thought processes, such as planning and reasoning. Research advances in cognitive psychology are providing a unique window from which to observe the developing brain by monitoring changes in mental abilities as they unfold throughout development. Even in newborn infants, researchers can now systematically observe and measure attention, perception, movement and coordination, and specific aspects of higher-order cognition. They are also examining how these processes interrelate and mature over time.

Research in this area has helped to clarify the causes of developmental disorders of language and learning. It is important to understand the mechanisms involved in specific language disorders because many children who have language impairments also tend to have behavioral disturbances. Language disorders tend to coexist with attention-deficit hyperactivity disorder and, to some extent, with conduct problems. In addition, language and learning disorders are significant and possibly intrinsic components of autism and Tourette's disorder. Developmental studies in other cognitive domains, such as spatial cognition, symbolic representation, and categorization, are also adding to our understanding of the causes of mental and behavioral disorders in young people.

Genetic Research

A great challenge for research on child and adolescent mental disorders is to determine whether a given cluster of symptoms or a disorder stems mainly from a disturbed environment, a genetic predisposition, or the interaction of both. Rapid advances in genetics research in general, as well as in the genetic study of mental disorders, have opened new doors to understanding how mental disorders arise in children and adolescents. As it becomes possible to map the human genome, it also will be possible to identify virtually any gene or group of genes that causes disorders presumed to be hereditary.

In recent years, the contributions of genetic factors in autism, childhood affective syndrome, Tourette's disorder, and attention-deficit hyperactivity disorder have been studied in some detail. For example, only 2 to 3 percent of the family members of children with autism have full-blown autism themselves. But less-severe variants of autism, such as language disorders and social deficits, occur among 25 to 30 percent of their family members--a much higher rate than is found in the general population. Findings such as this suggest that a mutant gene may be responsible for social and language deficits, while an additional factor is necessary for the appearance of the full clinical syndrome of autism.

Identification of mutant genes will lead to better understanding of the physiologic consequences of mutation and perhaps to the development of more effective and specific therapies. The discovery of genetic markers for the specific mental disorders will provide a powerful tool for identifying and helping children at risk before they develop symptoms.

A particularly exciting benefit of identification of gene markers for mental disorders will be the ability to identify and investigate gene/gene and gene/environment interactions directly. This advance would help in understanding the wide variability in the severity of autism, affective disorders, schizophrenia, and Tourette's disorder, even within the same families. Such variability in symptoms suggests that other genes may either enhance or reduce the effects of a particular mutant gene. This line of basic investigation is crucial to discover whether mental disorders can be prevented or made less severe by modifying the expression of protective genes.

RESEARCH RECOMMENDATIONS

Impressive opportunities are now available to advance our understanding of the causes of mental disorders in children and adolescents. To exploit these opportunities fully, however, additional research needs to be undertaken now.

Multidisciplinary research, for example, needs structures to support it. Many excellent groups of investigators are allied in disciplines such as developmental neurobiology, developmental cognitive psychology, developmental social psychology, child psychiatry, social

work, psychiatric nursing, and education. But these groups are often isolated by departmental affiliations and separated geographically. Opportunities for fruitful communication, mutual education, and collaborative interaction are rare. Few research centers are truly interdisciplinary, have an adequate number of investigators involved in teaching and research, and have ready access to patients. Funding mechanisms are needed to support the creation of such centers.

Several strategies should be considered to solve these problems. For example, NIMH should sponsor regular meetings that take a broad, multidisciplinary view of research on mental disorders of children and adolescents. It should encourage multidisciplinary research among geographically separated groups and should encourage the creation of multidisciplinary centers of excellence for clinical research in child and adolescent mental disorders. Such a structure would provide the most efficient mechanism for carrying out clinical studies not only on epidemiology, but also on pathophysiology, treatment, and preventive interventions.

Rigorous multidisciplinary research requires the availability of new research technologies for examining the cognitive, structural, functional, and even genetic factors that contribute to psychopathology in children and adolescents. More sophisticated uses of behavioral data and the necessity for managing complex databases, for example, require substantial computer support.

Unfortunately, few research programs related to child and adolescent mental disorders currently have ready access to properly equipped laboratories and essential equipment. NIMH must provide a major infusion of funds for equipment and modern research facilities to carry out these essential studies.

Beyond these general recommendations, four research areas require specific support:

- Research on experimental animals, especially nonhuman primates, is bearing fruit in connection with behavioral development, developmental cognitive psychology, neuroanatomy, chemistry, and physiology. However, increasing recognition of the special needs of research animals has made this type of research expensive. Nonetheless, because of their vital importance in research, properly managed primate centers are a valuable resource that NIMH should continue to support.

- A mechanism should be created to obtain for research the brains of individuals who died with developmental brain disorders. These "brain banks" will permit sophisticated postmortem analyses of brain tissue such as those that have led to remarkable advances in understanding Alzheimer's and Huntington's diseases.

- The causes and determinants of behavioral disorders in children with mental retardation or a history of brain damage, or both, remain poorly understood. Research on this neglected population, which receives negligible support from NIMH, would both improve the care of such children and clarify brain mechanisms in developmental-behavioral disorders.

- Of immediate concern are the causes of mental disorders found in disadvantaged children and youth. The rates of substance abuse, homicide, and suicide are escalating in this population. Discovering risk and protective factors for these young people presents a challenge to society as well as to science.

Section 3

Interventions for Child and Adolescent Mental Disorders

Robbie is 13 years old, and his parents want him out of the house. They say he has always been a difficult child and is getting worse. As a toddler, he was very active and stubborn, and attempts to discipline him were usually ineffective. In nursery school he was unusually distractible and impulsive. In early elementary school, teachers reported their concern not only about his distractibility and impulsivity, but also about his aggressive and antagonistic behavior toward other children.

When Robbie was 7, he was seen by a school psychologist and placed in a smaller, more structured classroom. Despite this effort to help him, Robbie continued to fight with his classmates and was ostracized by them. At times, his parents and teachers sensed that he suffered because of his loneliness and low self-esteem, but he was reluctant to discuss these issues with them.

In the intervening years, the situation became worse. Robbie was suspended or expelled from school on numerous occasions. Now in middle school, he attends a class for children with behavioral problems and is working considerably below grade level. He has no friends and engages in no extracurricular activities, having recently been dropped from the soccer team for fighting.

Robbie began smoking at 10, and he now drinks alcohol fairly regularly and uses marijuana and other drugs on occasion. He hangs around with older adolescents and was recently arrested for shoplifting. Robbie says he knows people think he is a "loser" and a troublemaker, but he blames his family and says, "I can't wait to be on my own."

Robbie has been diagnosed as having conduct disorder, a mental disorder that may begin in the preschool years, but does not become fully apparent until later childhood or adolescence. The essential feature is a persistent pattern of behavior in which children violate social rules and the basic rights of others. Physical aggression is common. Young people with conduct disorder initiate fights and can be physically cruel to people and animals. They may steal, and the stealing may involve confrontations with the victim, as in a mugging or armed robbery. Often a youngster with this condition has a history of truancy from school and episodes of running away from home.

Youngsters like Robbie often have an increased risk of alcohol and drug abuse. Many continue to have similar difficulties in adult life. Frequent physical fights in the school years, for instance, can escalate into assault or even homicide. It has been found that the vast majority of serious antisocial behavior in adulthood begins as conduct disorder in childhood and early adolescence, and almost half of all youngsters with conduct disorder become antisocial adults.

But such tragic outcomes need not happen. A variety of psychotherapeutic techniques and even some drug therapies show great promise in curbing conduct disorder and helping young people control their behavior. More thorough studies of how such techniques work--and how well--may offer a way to prevent some of the most serious social consequences of conduct disorder. Better treatments may help youngsters such as Robbie grow up to become society's assets rather than its liabilities.

Mental health professionals call upon a broad array of approaches for treating and preventing mental disorders in children and adolescents. This section provides an overview of the major types of interventions now in use.

These include various forms of psychotherapy ("talk therapy" and behavior therapy), pharmacotherapy ("medication" or "drug treatment"), and combinations of these approaches.

PSYCHOTHERAPY

More than 230 psychotherapeutic techniques--conducted with individuals, groups, or families--are in use for treating children and adolescents with mental disorders. They focus on various psychological processes, behaviors, or family interactions. Clients may be treated in therapists' offices, homes, and schools, as well as in hospitals and other community settings.

Several similar techniques can be applied to a wide range of clinical problems. Behavior therapy, for example, is used for treating conduct disorder, attention-deficit hyperactivity disorder, eating disorders, anxiety disorders, and dysfunctions associated with mental retardation. A brief summary of the highly promising treatments developed for treating conduct disorder illustrates both the range of available therapies and the research progress being made to find and refine effective and safe treatments for children like Robbie.

One approach now under study is parent management training, a therapeutic technique in which parents are taught to interact more effectively with their children. This training is based on observations that in many families, although behavior problems develop inadvertently, they are sustained by certain parent-child interactions. Parents of children with conduct disorder need special help and training in effective ways of handling these difficult children.

A number of studies have shown that parent management training can improve a child's behavior at home and at school, and can reduce antisocial behavior. In addition, the behavior of other children in the family improves in many cases, reducing their risk of developing conduct disorder.

Although parent management training can be extremely effective, other treatments may also be needed, especially when parents, because of their own problems, are unable or unwilling to cooperate. Youngsters with conduct disorder can also be helped considerably through interventions in the schools and in community settings. For example, community-based interventions conducted in local recreational or youth centers emphasize the advantages of having delinquent children associate with nondelinquent peers. Studies have shown that this approach helps counteract the strong, negative peer-group influences that encourage antisocial behavior.

Research has revealed the benefits of psychotherapeutic interventions for many other mental disorders of children and adolescents, including autism, attention-deficit hyperactivity disorder, eating disorders, sleep disorders, mood disorders, and anxiety disorders. However, many of these treatment approaches require further systematic study to determine how well they work, how they are

best administered, and what is the best match between specific treatments and the individual characteristics of youngsters in treatment.

PHARMACOTHERAPY

Many children like Robbie have a dual diagnosis--conduct disorder and attention-deficit hyperactivity disorder. In addition to psychotherapy, these children often receive drug therapy. Stimulant medications, for example, have been used for more than 50 years to treat attention-deficit hyperactivity disorder. They improve a youngster's ability to pay attention and reduce hyperactivity, impulsivity, and distractibility.

Research on the use of medications to treat mental disorders of children and adolescents has expanded greatly during the past decade. Treatments have been developed specifically for children (as with attention-deficit hyperactivity disorder) or have been adapted from adult psychiatry. Haloperidol, for instance, an antipsychotic medication widely used with adult schizophrenics, can also reduce some of the bizarre symptoms seen in preschool children with autism. Preliminary findings suggest that other medications, such as lithium, beta blockers, and naltrexone, may be useful in treating children with mental retardation who are extremely aggressive and self-injurious. Lithium, as well as carbamazepine, an anticonvulsant, may also have beneficial effects on children who are explosively aggressive.

In the past several years, there has been substantial progress in improving the range and quality of measures for diagnosing and monitoring mental disorders, including depression, anxiety, learning disability, attention-deficit hyperactivity disorder, brain injury, and eating disorders. Reliable methods for measuring the impact of treatment have also been developed recently that will enable investigators to compare many aspects of various types of interventions.

Advances in statistical techniques have expanded the range of research questions that can be asked and the complexity of analyses that can be carried out. These advances will allow researchers to study many of the interactive processes that take place over the course of development as well as during treatment. Careful application of these techniques will lead to more rational and effective treatments for children and adolescents.

Despite such advances, more work needs to be done in a number of areas. Clinical studies are the best way to evaluate treatment, but clinical data are now available for only a few of the most commonly used treatments for children and adolescents; such studies need to be expanded. There is also a pressing need to broaden the range of methods that have been empirically studied. Reliable information about the everyday practices of clinicians must be gathered if funds spent on treatment research are to be put to the best use.

It is also important to determine whether promising single treatments can be made more effective by combining them with other therapeutic approaches. It has been suggested, for example, that a combination of pharmacotherapy and behavioral therapy may be more effective than either treatment alone for treating childhood depressive disorders, attention-deficit hyperactivity disorder, and some other disorders. However, there is almost no research to guide clinicians in identifying which therapeutic combinations work best.

Many critical questions remain to be answered: Are psychological and pharmacological treatments additive in their effects? Can medication increase or decrease a child's response to psychological intervention? Is a

particular sequence of the two forms of therapy most desirable? Are certain drug and psychological treatment combinations more effective than others? Can the presence of specific symptoms indicate which children are likely to respond to drug therapy? Carefully controlled studies are needed to answer these questions and suggest ways to make current treatment methods more effective.

Follow-up studies of the long-term effects of treatment are especially important because such effects may differ from those seen immediately after treatment. Some treatments that appear to be effective in the short run do not show sustained effects; others produce little or no immediate effect but result in significant improvements 1 or 2 years later.

PREVENTIVE INTERVENTIONS

The ultimate goals of mental health research are to understand enough about disorders to prevent them from ever occurring or to minimize their frequency and severity. Research studies focused on risk factors for mental illness, such as those discussed in Section 2, have helped to pinpoint several populations of children who are particularly at risk for developing mental and behavioral disorders. Such children have often been the subjects of prevention studies that attempt to stave off mental illness or reduce its severity.

Preventive interventions are likely to be cost-effective and relieve individual families and society of great suffering and expense. Preventive programs directed at young children typically include several features: 1) special classes or sessions with the children; 2) contact with the parents and involvement with the family; 3) sensitivity to special needs of the family concerning education, health care, childrearing practices, and child development; and 4) protracted and intensive intervention over a period of 1 or more years.

Since child abuse is known to be a risk factor for mental disorders in children, a recent prevention intervention study was designed to reduce the chances of abusive behavior by parents. The researchers randomly assigned 400 first-time parents, 85 percent of whom had risk factors known to be associated with child abuse (i.e., being teenaged, unmarried, living in poverty), to four groups: Parents in the first group were offered health screening of their infant at 1 and 2 years of age. Parents in the second group were offered, in addition to child screenings, free transportation to prenatal and well-baby medical appointments. Those in the third and fourth groups were given screenings, transportation, and nine home visits by a nurse during pregnancy. However, for parents in the fourth group, nurses' visits were extended to the baby's second birthday. In addition, the nurses kept the parents in touch with service agencies when necessary and provided parenting and health education as well as consultation on family and social issues.

The clearest benefits were reaped by the parents who received the most extensive intervention. Among the poor, unmarried teenage mothers, 19 percent of those in the first group abused or neglected their infants within the first 2 years of life. But only 4 percent of the mothers in the fourth group maltreated their children. Although child maltreatment was not completely eliminated in this study, it was appreciably reduced by a relatively simple program that could be duplicated in many other communities.

Research potentially leading to other types of preventive interventions is underway for several specific mental disorders. For example, bipolar disorder (manic-depressive illness), schizophrenia, and alcoholism all have genetic components that could lead to new preventive strategies. Prevention research exploring these new approaches, as well as more traditional ones, is critical if the

rate of mental disorder among young people is to be reduced.

RESEARCH RECOMMENDATIONS

Treatment Research

Several types of treatment research are needed. Existing research indicates that a number of psychopharmacological and psychotherapeutic techniques are effective in treating specific mental disorders of children and adolescents. The number of outcome studies devoted to evaluating such treatments should be greatly increased.

High priority should also be given to clinical studies of the efficacy and safety of medications; their effects on learning, performance, and IQ; comparisons of drug, psychosocial, and combined treatments; and comparison of drug therapy, therapy involving the parents as cotherapists, and combined therapies.

Research is needed to identify the best match between youngsters with a given disorder and specific treatments. For example, among depressed children, which kinds of patients will be helped by pharmacotherapy, by psychotherapy, or by combinations of these therapies? At what stage of their illness are various treatments most effective? Studies matching treatments to clinical problems are essential and should be supported.

Combined treatments warrant research attention for several reasons: Many children and adolescents have multiple disorders; many disorders adversely affect functioning in several areas; and residual problems often remain after treatment of a specific disorder. Pharmacotherapy, behavior therapy, and cognitive therapy are all relatively well specified, focus on different facets of functioning (thus are likely to be complementary in their effects), and include procedures that can be applied to diverse disorders. Studies of combinations of these three treatment approaches should be made high priorities for treatment research concerning mental disorders of children and adolescents.

Many treatments judged to be effective in clinical practice have not received sufficient research attention. Individual psychotherapy, family therapy, psychodynamically based treatment, and relationship therapy are primary examples. High priority in funding should be given to studies of treatments used in clinical practice but as yet inadequately tested, and to evaluations of the efficacy of promising new research-based treatment approaches applied to clinical settings.

Several behavior therapy and cognitive therapy techniques have shown promise in carefully evaluated research settings but have yet to be extensively evaluated in clinical practice. Such evaluations are needed to extend the range of effective treatment options available for children and adolescents in community service settings. This is an especially appropriate time to gather such information, given the growth in basic and intervention research as well as improved methodology for evaluation research. Because properly conducted evaluative research is likely to be labor-intensive and expensive, certain high-priority areas will need to be identified.

Individual studies alone will not lead to the development of effective interventions. Recruitment, treatment, and follow-up of patients 1 to 2 years after treatment are essential in any study designed to evaluate the impact of treatment. Funding for investigators carrying out long-term studies of treatment should be increased. The prospect of continued funding would stimulate research on the treatment of child and adolescent mental disorders. The development of effective treatments requires a series of studies using various research strategies. Currently there are no mechanisms to support the needed programmatic research.

Historically, funds have been available for individual studies on the efficacy of particular treatments for particular problems, but not for efforts to integrate the findings of multiple studies. This omission should be corrected. Both individual studies and integrated findings are essential to the development of knowledge of the field. Integrated findings can help identify the kinds of therapies that have proved most successful with various mental disorders as well as the disorders that have proved most resistant to treatment. They can also aid in identifying replicated findings that warrant large-scale intervention projects, as well as the gaps in knowledge requiring further research.

Larger scale studies of treatments, in which several investigators at different sites undertake simultaneous evaluations, should be funded. Such studies provide critical information about the reliability and reproducibility of treatment effects.

Existing information about the effects of treatment need to be used more efficiently. Efforts to record, organize, and integrate existing information would strengthen the link between research and ongoing clinical activity, promote the sharing of resources, and clarify the overall state of knowledge in the field. Data from clinical settings, for example, could provide information on patients, treatments, and the effects of treatment. Analysis of such data could reveal the kinds of people who seek treatment, problems for which treatment is sought, the kinds of interventions typically used for various problems, and the changes produced by these treatments. Data on patients could also aid in identifying appropriate targets for preventive efforts.

Recently expanded requirements for reporting on patients and services, coupled with the ease of access to such information through computers, make development of patient databases increasingly possible. Because there is currently no outside source of funding for database development, NIMH should foster development of database systems for use in clinical services for children and adolescents.

Centers for treatment research on children's mental disorders should be funded, perhaps through program project and clinical research center grants. Such centers would provide stable funding for a cadre of researchers. The need for stable, long-term funding cannot be overemphasized, given the social and economic importance of identifying, developing, and evaluating effective treatments.

Prevention Research

Prevention research needs to be expanded, with high priority given to those groups of at-risk children that can be identified early in development. Particular emphasis should also be given to efforts to prevent clinical dysfunction among children who have been subjected to abuse (physical or sexual) and neglect, children of parents with psychopathology (including substance abuse, antisocial behavior, and depression), and children at severe social disadvantage.

Improvements in treatment and prevention are also likely to emerge as further progress is made in understanding the causes and determinants of clinical disorders.

Section 4

Service Delivery and Systems of Care

At present, the complex child and adolescent mental health service system, although undergoing much-needed improvements, is still extremely fragmented and uncoordinated, with appropriate services inaccessible to many young people and their families. As a result, it often fails to meet the needs of the very populations who might benefit most from such services.

As the results of a recent study of children's mental health by the U.S. Office of Technology Assessment indicate, "The majority of children with mental health problems fail to receive appropriate treatment. Many of the 6 to 8 million children in our Nation who are in need of mental health interventions receive no care; other children, perhaps 50 percent of those in need of treatment, receive care that is inappropriate for their situation." Thus, improving the appropriateness, quality, availability, accessibility, and economy of mental health services for our young people is vital.

Mental health services for children and adolescents are provided through a web of social institutions that span the mental health, general health, social welfare, education, and juvenile justice systems. Their character is shaped by many forces. These include Federal health and welfare policies, legal decisions, and the policies of private-sector institutions such as the health insurance and health care industries.

In the early 1980s, the status of services for youngsters with mental disorders was grossly inadequate. In most communities, the only service option available was infrequent office-based outpatient treatment or hospitalization, with excessive reliance on the latter. Many States had no full-time children's mental health staff person in their State offices, and only seven States had made significant progress toward developing a continuum of services. Collaboration among public agencies to meet the needs of children and adolescents was the exception rather than the rule.

Since that time, with considerable assistance from the NIMH Child and Adolescent Service System Program (CASSP)--an initiative designed to improve systems for service delivery for children and adolescents with very severe mental disorders--many States have become more responsive to the needs of these youngsters and their families, and have strengthened their capacity to provide leadership in this area. Some new service models have been developed that provide intensive services in home and community-based settings, the role of parents has been redefined, and interagency collaboration has become more common.

Despite recent efforts to improve service systems for children and adolescents, far more progress is urgently needed. For example, many States continue to allocate two-thirds or more of their children's mental health budget to residential or hospital treatment. As the

Invisible Children Project of the National Mental Health Association reports, about 5,000 children are placed out of their own State each year in residential treatment facilities. Furthermore, at the same time that the public mental health sector has been emphasizing the need for community and family-based systems of care, the number of free-standing psychiatric hospitals for children and adolescents has rapidly expanded.

Part of the inadequacy of care clearly relates to a lack of resources. Another major factor, however, is the inadequate knowledge base about the causes and treatment of mental disorders in children as well as the mechanisms for establishing and maintaining responsive and effective service delivery systems. Mental health services research, although a relatively young field, can provide an essential base of empirical knowledge to help policymakers bring about such changes. By examining and evaluating the structure and process of existing service delivery systems, by testing innovative changes in these systems, and by developing and testing new service models such research can provide a basis for developing much more effective and appropriate forms of service delivery to children and adolescents with mental disorders. Additional mental health services research on specific problem populations seems especially urgent at this time.

Most children with mental disorders are not seen by mental health specialists. Thus, study of the quality of mental health service delivery in routine health care is critical. This research area includes studies on the accuracy of diagnosis and the effectiveness of treatment for children with mental disorders and their families in a variety of health settings and systems of care. At present, little information is available about how primary care providers recognize, diagnose, and treat mental illness in children and adolescents. Important research topics in primary care include studies on consultation/liaison psychiatry, psychiatric emergency services, and the effectiveness of mental health treatment and referral from primary care providers.

In addition, research on the delivery of mental health services in the schools and the juvenile justice system is essential to an understanding of child and adolescent mental health care in the U.S. The rapid expansion of the role of the educational system in providing mental health services to children and adolescents since the passage of Public Law 94-142 and Public Law 99-457 has proceeded with almost no attention from researchers. The important role of the school as a locus for early identification of mental disorders and as a source of treatment through the Education for the Handicapped Act needs to be understood and enhanced. Particularly lacking is any knowledge on the interface between schools and health or mental health care systems. The effectiveness of mental health services for schoolchildren with severe mental disorders is also largely unexplored.

These same concerns and questions hold true for the juvenile justice system. Adolescents with mental disorders or at high risk of disorder may be disproportionately represented in correctional facilities, and both the quality and quantity of mental health care in those settings are unknown.

New studies of the general population as well as clinical experience indicate that mental disorders and substance abuse often co-occur. Some research findings indicate that having depression or anxiety disorders in adolescence doubles the risk for later drug abuse or dependence. Research on the impact of this co-occurrence on alcohol, drug abuse, and mental health (ADM) services would contribute to improved care, especially in public-sector agencies. Studies on adolescents with co-occurring ADM disorders should include both methodologic development and studies of diagnostic accuracy and treatment effectiveness in this difficult population. Research on

the possible reduction of subsequent drug abuse by early treatment of depression or anxiety disorders is also needed.

The increasing prevalence of chronic medical illness among children and adolescents, as well as a growing awareness of the significant psychosocial problems encountered by families with chronically ill children and adolescents, have underlined the importance of research on mental health services for these children. Preliminary research evidence suggests that some chronic medical disorders may increase the risk of specific mental disorders in childhood and adolescence. These findings include an increased prevalence of depression and anxiety disorders in children with cancer, as well as increased adjustment disorders and substance abuse in children and families affected by congenital heart disease. The AIDS epidemic, as the most visible chronic disease of children and young families, has served to highlight the individual and societal burden of inadequate mental health services and insufficient knowledge of specific needs for such services. Studies on needs assessment, barriers to care, and models of effective mental health interventions are critical. Additionally, attention to the measurement of health and mental health status in this complicated population is imperative if significant progress is to be made in this important area of study.

At least five significant developments at a service and policy level have recently converged to underline the practical importance of more and better research on services and systems of care. First, the primary locus of treatment in the mental health field has moved from hospitals to community settings. This shift has created new challenges in understanding how to develop effective community service systems. Second, public mental health systems have identified as their top priority the improvement and integration of services to individuals with severe and persistent problems, creating a need to consider multiple agencies in system development. Third, the role of States in planning and administering mental health services has grown with the implementation of the Alcohol, Drug Abuse, and Mental Health Services Block Grant program in 1980. Fourth, there has been a rapid escalation of costs for health care in general, including mental health care. As a result, there is increased need for research on such issues as approaches to cost containment and the impact of different reimbursement strategies on service delivery. Finally, rapid advances in treatment interventions and diagnostic capabilities for mental health disorders of children and adolescents require an improved understanding of routine mental health care delivered in clinical settings in schools, general medical care sites, and in the mental health system.

Until the past few years, there had been an almost total lack of research on service delivery and systems of care related to child and adolescent mental health. However, NIMH has since begun to encourage more research on the child mental health service system, as well as improvements in technologies--such as outcome measurement--for conducting such research. The NIMH Public-Academic Liaison (PAL) initiative, announced in 1988, has already had visible effects in some States in the form of increased collaborations between university-based researchers and public treatment facilities. In addition, in December 1988, NIMH announced an important new initiative specifically encouraging research related to mental health services for children and adolescents. The response from the field has been excellent: Of 29 proposals submitted, 7 have received funding.

These and other signs underscore the current need and the unique opportunity for research on service delivery and systems of care related to the mental health of children and adolescents. There is growing interest within the academic community, and policy makers

and advocates are eagerly seeking a strong research foundation for improving the system of care.

Research Recommendations

NIMH should continue to expand its support of research on service delivery and systems of care for children and adolescents who have mental disorders or are at risk of having them. Particular emphasis should be given to studies that address the following service system research and clinical services research questions:

Service System Research

1) How effective are strategies to provide alternatives to residential treatment through comprehensive community-based systems, such as the Robert Wood Johnson Foundation's Mental Health Service Program for Youth?

2) How effective are innovative service approaches for children and adolescents with serious mental disorders and their families, such as intensive home-based services, therapeutic foster care, respite care, family support, day treatment, mobile crisis services, case management, and individualized treatment using flexible funds?

3) What are the effects on the quality, cost, and appropriateness of care of different reimbursement mechanisms and funding strategies within both the public sector (e.g., Medicaid and CHAMPUS) and the private sector (e.g., major private insurance carriers)?

4) How are efforts at cost containment or new financing mechanisms, such as capitation and managed care, changing the delivery of mental health services to children and adolescents?

5) How effective are various approaches to involving and supporting families of youngsters with mental disorders?

6) What are the effects of multi-agency collaboration on the identification, referral, and treatment of children and adolescents with mental disorders?

7) How effective and culturally appropriate are various mental health services used by minority children and adolescents and their families? What barriers deter their service use?

8) What is the multi-level organization and interrelation of mental health services for children and adolescents with mental disorders?

Clinical Services Research

1) What is the state and impact of assessment, case planning, and clinical decision-making practices in child and adolescent mental health services?

2) What tools and instruments are needed to measure accurately the outcomes of mental health evaluation and treatment?

3) What are the unique mental health needs of children and adolescents with chronic medical illnesses, and what are effective interventions for these children and their families?

4) What is the quality of mental health service delivery in routine health care? How accurate is diagnosis and how effective is treatment for children with mental disorders and their families in a variety of settings and systems of care? How do primary care providers recognize, diagnose, and treat mental disorders in children and adolescents? What is the impact of consultation/liaison psychiatry, psychiatric emergency services, and the effectiveness of mental health treatment and referral from primary care providers?

5) What interface exists between schools and health or mental health care systems for

children with mental disorders? How effective are mental health services provided by the educational system?

6) What is the representation of adolescents with mental disorders or at high risk of such disorders in correctional facilities? What is the quality of mental health care in those settings?

7) What are the best ways for mental health providers to respond to the needs of children and adolescents with mental disorders that co-occur with alcohol and/or drug abuse?

Improved methodologies need to be developed for describing and measuring community-based systems of care, for assessing outcomes in children and adolescents, and for assessing the cost-effectiveness and cost-benefit of services. In addition, research designs need to be devised that take into account the special limits of research on service delivery programs yet permit conclusions to be drawn about their impact. Such information, obtained from many service delivery systems, can contribute directly to the identification of effective interventions.

Evaluation must be an integral part of demonstration and service projects from their beginning. Many mental health treatment services for children and adolescents are unevaluated because agencies with the greatest expertise in the delivery of services lack expertise in conducting systematic evaluations of them. Service systems should have the resources both to provide and to evaluate services. By collaborating with academic institutions that conduct evaluation research, service organizations can learn about the impact of their services and identify the people for whom such services are most effective.

As indicated in Section 1, coordinated efforts are needed to describe more accurately the costs of child and adolescent mental disorders and of their treatments. A Federal initiative can assure that appropriate kinds of data are collected. NIMH should also fund evaluations of ongoing mental health programs that can provide information about the costs and benefits of treatment.

While basic, clinical, and epidemiologic research hold great promise for improving the scientific understanding of mental disorders in children and adolescents, mental health services research can demonstrate the best ways to apply new knowledge in practice. With a determined effort to apply research findings in everyday systems of care, the delivery and financing of services can be steadily improved from their present fragmented and uncoordinated state.

Section 5

Capacity-Building

Continued progress in child and adolescent mental health research hinges on developing a cadre of well-trained, committed researchers devoted to the field. A small but dedicated band of researchers in many disciplines now pursues research careers in child and adolescent mental health in the face of few incentives and many disincentives. But the field must be replenished and expanded if we are to see the accelerated growth in knowledge needed to conquer these disorders. Such progress requires special efforts and special resources.

Fulfilling this research agenda requires systematic efforts to:

1) attract and retain well-trained researchers;

2) focus their efforts in key research issues in need of directed and intensified study (while maintaining a steady flow of creative, investigator-initiated research);

3) provide the technologicala resources needed to conduct state-of-the-art research;

4) deploy scarce research resources, including researchers, equipment, and funds, in ways that encourage their most efficient use.

In this section, we outline some of the problems and needs in the field of child and adolescent mental health research and suggest key mechanisms NIMH should adopt to assure that a strong research infrastructure will permit continued rapid advances in our knowledge and its clinical application.

The Pool of Researchers

The child and adolescent mental health field urgently needs the new knowledge that research can contribute. Yet it has almost always lacked the support it deserves and requires for research and research training. Reasons for this lack include the stigma associated with mental illness; the relatively low status of those working with the young, especially youngsters with handicaps; the complexity of problems addressed by the field; and the fact that the disciplines involved have generally concentrated on meeting the enormous need for services rather than undertaking basic and applied research.

Data about the supply of mental health researchers are sobering. Despite the exciting advances that continue to be made, the number of people entering mental health research is insufficient. One measure of this reality is the increasing average age of mental health researchers. At present, the average age of investigators supported by NIMH and its sister institutes in the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) is 45 years; the average age of ADAMHA-supported researchers is increasing twice as fast as it is for researchers supported by the National Institutes of Health (NIH). Available data suggest that current training programs are failing to meet the serious need for more researchers studying child and adolescent mental health disorders.

The field of child and adolescent mental health needs a core around which an aggressive new research effort can coalesce. A cadre of outstanding investigators, research

programs, and institutions could provide continuing leadership for a vigorous research initiative. Given the diversity of research needs and opportunities, no single specialty is likely to be the core; rather, that role probably will be shared among several disciplines that have distinct but overlapping areas of interest.

The four "core" mental health disciplines--psychiatry, psychology, psychiatric social work, and psychiatric nursing--have been and continue to be key sources of researchers on child and adolescent mental disorders. Within them, some subspecialties, such as child psychiatry and developmental and clinical psychology, bring additional expertise that is invaluable for such research.

Many other disciplines are germane to child and adolescent mental health research and need to participate even more. These include pediatrics, family medicine, education, and many basic biomedical fields such as neuroscience and genetics. Epidemiology, economics, sociology, and other social sciences germane to mental health services research are also potential areas for research recruitment.

Although a broad range of disciplines might provide needed research personnel, the lack of incentives and of well-structured career paths now results in relatively few recruits. Competing demands on many of these talented professionals draw some away from research careers entirely. Others, although attracted to research, are deterred from choosing the child and adolescent mental health research area because they see little chance of receiving stable funding. The small size of the existing research community exacerbates these recruitment problems because the field often lacks visibility within the academic community, and there are few role models and mentors to attract and train the next generation of researchers. These issues are discussed in more detail below.

Child psychiatry represents an extreme example of the recruitment problem. The long, broad-based training of child psychiatrists in both medicine and the behavioral sciences, as well as their clinical competence should place them at the center of many types of research involving children and adolescents with mental disorders. Yet, at present, very few academic child psychiatrists in the United States are able to sustain a major research commitment for more than a few years. Multiple teaching, clinical, and administrative demands are made on these individuals. As a result, fewer than 100 academic child psychiatrists are currently devoting 30 percent or more of their time to research; fewer than 20 can be considered full-time investigators, spending 80 percent or more of their time doing research. And the numbers probably will continue to decline. Only about 4 percent of medical students choose psychiatry as a specialty, and only about one-fifth of them intend to enter child psychiatry.

Present prospects for increasing the number of psychologists undertaking research careers in child mental health are also not encouraging. Most new clinical Ph.D.'s are engaged in the delivery of human services, with little or no research involvement. In clinical child psychology, the shortage of researchers is less acute than it is in child psychiatry, but there is little room for complacency. The number of new clinical psychology Ph.D.'s produced each year has remained fairly stable at about 3,000 during the past decade, but the majority do not become heavily involved in research careers; even fewer focus on research related to child and adolescent mental disorders.

In developmental psychology, the situation is different. The number of Ph.D.'s awarded in this area has actually increased slightly in the past decade. And in contrast to clinical psychologists, nearly two-thirds of developmental psychologists are employed in university, college, medical school or other academic settings. However, in many other areas of

psychology relevant to research on child and adolescent mental disorders, the number of new Ph.D.'s in recent years has remained steady or declined.

Social work is another field that makes a substantial contribution to the clinical care of children with mental disorders. More than 200,000 social workers provide a variety of services in various settings, with more than 25 percent working in the area of mental health. Because social workers tend to earn relatively low salaries compared with other mental health professions, significant financial support for tuition and stipends is necessary to attract and retain talented individuals.

Child psychiatric nursing is a relatively small but key component of the mental health profession. Child psychiatric nurses provide care in many community settings, including hospitals, clinics, schools, and other social institutions. Of the 2 million nurses in practice in the United States, about 5,000 are doctorally prepared. Fewer than 1,000 nurses have masters or doctoral degrees specifically in child psychiatric nursing, although over 45 doctoral programs now exist in the United States to support research training.

This discipline offers a unique research perspective on the mental disorders of the young. Researchers in child psychiatric nursing focus on both children and their families. Research on improving the delivery of clinical services is a natural area of interest, as is the study of the delivery systems through which such care is offered. Also of interest are programs designed to promote early detection of and intervention for developmental problems, especially for children with serious disorders who need prolonged medical care, including premature and/or addicted newborn babies.

Pediatricians and family medicine practitioners have much to offer child and adolescent mental health research as well. Their fields strongly emphasize health promotion and the prevention of and early intervention in psychobiological disorders of infants, children, and adolescents. Furthermore, pediatricians and family practitioners are often the first health professionals to have contact with a child or adolescent suffering from a developmental or mental disorder.

Fortunately, an increasing number of pediatricians are seeking formal clinical and research training in the psychosocial and developmental aspects of pediatrics. Behavioral pediatrics, for example, and other subspecialties of pediatrics with a strong tradition of basic and clinical research will provide a source of developmentally oriented research physicians for collaborative research on child and adolescent mental disorders.

Other clinically oriented disciplines that have a major involvement with children and adolescents with mental disorders may also be potential sources of researchers and research collaborators. Links between them and research programs on child and adolescent mental disorders would be invaluable, as would a greater research emphasis within the disciplines themselves.

Education specialists and school psychologists, for example, have major insights to offer about working with the young. Schools are responsible for providing education for all young people, including those who are mentally retarded and those with a variety of other disorders, such as autism, attention-deficit hyperactivity disorder, and many poorly defined disruptive behaviors. Indeed, for many children and adolescents with serious, long-term mental disorders, education is the major ongoing intervention available. However, at present, connections between school programs and other disciplines within the child and adolescent mental health field are scant; little advantage has been taken of research opportunities within such settings.

Children and adolescents with mental disorders are also cared for in settings such as juvenile detention systems and an array of homes and institutions providing short- and long-term housing for youths who have failed to do well in more traditional settings (either because of their own behavior or because their parents or guardians provide inadequate care). Historically, interactions between researchers and such caregivers and the systems they administer have been characterized more by mistrust than by mutual respect. Yet, the potential benefits of collaborations are so great for both sides that continued efforts must be made to foster them.

Research Collaboration

Collaboration and exchange among researchers from the various disciplines dealing with childhood mental disorders also needs strong encouragement. These efforts should include researchers at all career levels, from trainees to senior faculty. Particular support should be given to arrangements that ensure that investigators whose interests cross departmental lines have adequate opportunities for rewards and prestige, including academic tenure.

If clinical departments engaged in research on child and adolescent mental disorders are to fulfill their mission, they must obtain the active participation of basic scientists, whether they specialize in psychological or social mechanisms or in biological processes. Ties should be fostered between academic researchers and settings especially relevant to children and adolescents with mental disorders, including schools, correctional centers, and residential homes.

Nonclinical academic settings, such as schools of public health and departments of psychology, sociology, economics, and anthropology, also may be appropriate sites for research centers in child and adolescent mental health. Collaboration among clinical and experimental psychology programs, schools of education, sociology departments, social work programs, or child development programs would be especially useful. Key figures within schools of public health and departments of economics and epidemiology might also be recruited to these efforts. In addition to the intrinsic value of the research they support, such programs increase the likelihood that young potential researchers will become aware of and attracted to the multiple fields that focus on child and adolescent mental disorders.

Institutional Structures

Research requires some structural arrangement that, at a minimum gives access to the population being studied and provides needed facilities and equipment. The child and adolescent mental health field has relatively few examples of such complete research structures. Productive research is impossible without appropriate equipment and facilities, yet the vast majority of potential sites for such research lack even these fundamental requirements.

Few sites appropriate for clinical research on child and adolescent mental disorders now exist. Valid clinical research needs long-term, well-organized facilities with ready access to appropriate subject populations, resources for analyzing large amounts of complex data, and funds necessary for maintaining good care of study volunteers. More appropriate settings for such studies must be provided.

Adequate settings for basic research are also in short supply. No more than six child and adolescent mental health research programs in this Nation have laboratories with even the most rudimentary equipment required for biological research on brain development at the genetic, molecular, and cellular levels. Of those, even fewer have the equipment needed to place them in the forefront of existing technology. In most institutions, child and

adolescent mental health researchers must compete for funds and space with other, better established programs; distressingly few have done so successfully.

Redressing the general lack of facilities for conducting research on mental disorders in childhood and adolescence will not be easy. The development of appropriate settings probably will entail partnerships among academic institutions, the private sector, State and local governments, and some Federal agencies. The first step is recognition of the need to develop financial resources for construction or remodeling of facilities. NIMH may need to seek special legislation to permit the use of Federal funds to support renovation or construction.

NIMH Research and Research Training Support

The NIMH research budget for FY 1989 was $313 million, supporting more than 1300 research grants and awards. Of this, an estimated $70 million went to support investigators in the field of child and adolescent mental disorders. Of the few awards available over the past 3 years, most have gone to established investigators because no mechanism exists to ensure support for appropriate numbers of researchers at all career stages.

At present a critical mass of investigators exists in only a handful of child and adolescent mental disorder research programs. For example, 10 universities and medical centers account for 64 percent of the research portfolio of the Child and Adolescent Disorders Research Branch of NIMH. These same programs account for a disproportionate share of the research reports in the field.

The NIMH research scientist award system needs a clear organizing structure with linkages among the programs that could provide a clear path for talented young researchers. Such a structure might improve the chances of retaining young investigators long enough for them to become independent researchers. In addition, support should be available to encourage somewhat more advanced researchers to obtain supplemental training in relevant areas. These programs could provide stable funding for at least 5 years for the most promising young researchers, freeing them from the frustrations and conflicts of unfunded research in the early years.

Research scientist awards are intended to guarantee research time for young investigators--usually at least 75 to 80 percent. However, actual stipends usually do not cover the allotted salaries, placing the researcher or the institution in the difficult position of finding additional funds. Some institutions even have reservations about allowing faculty to apply for these awards because of the financial liabilities the institutions incur. Regular review could ensure that stipends are realistic and appropriate.

Many investigators in the field of child and adolescent mental health emphasize the need for more appropriate mechanisms for peer review of research proposals. Typically, NIMH peer-review groups have only one or two people with expertise in areas relevant to child and adolescent mental disorders. There is a strong consensus within the field for creation of one or two review committees explicitly for child and adolescent mental health research.

Researchers also indicate that the duration of research grants is often too short to permit reasonable research progress. In the past, grants typically received funding for 5 years. Because of the scarcity of resources for research, grants for more than 3 years are now rare. For some research projects--especially the longitudinal studies that are particularly important in child development research--3-year grants are particularly burdensome; longer funding cycles would foster stability.

Another consequence of scarce resources appears to be the loss of funding for early exposure of undergraduates, graduate students, and medical students to clinical and basic research opportunities. These typically "unnamed slots" in grant proposals are easy targets for cost savings, but they offer incomparable recruitment opportunities at relatively minor expense.

Support for research training in child mental health is neither broad nor deep. In the main, research training support comes from NIMH, with limited funds from its sister institutes within the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) and from the National Institutes of Health (NIH) for those future researchers whose training objectives cut across disorders.

NIMH has a range of mechanisms to support research training and further development along a research career. Only one of these is specifically intended for child and adolescent mental health researchers. We believe that, generally, the quality and diversity of the research training mechanisms are sufficient to meet the needs of the field. However, the level of research training support is severely inadequate.

A review of the actual numbers of trainees and young investigators being supported by NIMH reveals the generally impoverished state of the research training and career development programs for mental health researchers. NIMH supports research trainees both through its general research budget and through the National Research Service Award (NRSA).

Between 1981 and 1985, NRSA positions dropped from 1,300 to 996, and this area has seen little growth in this area over the past 3 years. The appropriations for FY 1989 support only 837 trainees and fellows. In FY 1988, only $1.5 million of the NIMH research training budget of $19 million was targeted specifically to research training in child and adolescent mental disorders.

The NRSA program has been quite beneficial for the mental health field, including child and adolescent mental health research. However several difficulties limit its usefulness. Individual indebtedness, for instance, can greatly influence the likelihood that a potential researcher will seriously consider a research career. For some research areas with critical personnel shortages, such as AIDS, trainees going into research are forgiven a portion of their educational loan debt. No such arrangement exists for child and adolescent mental health research. Beyond that, stipends are low. Realistic assessments, with periodic adjustments for inflation and other factors, are needed.

Within existing NRSA regulations, trainees in clinical programs may participate in research only if they take time off from their clinical training, thereby lengthening their time as trainees. It should be possible to combine research and clinical training when appropriate.

More attention should be paid to the creative use of short-term grants aimed at undergraduates, medical students, and predoctoral researchers to cover the research costs of undergraduate honors projects and dissertations. At a small cost, such programs can greatly enhance the ability of established investigators to interact with and encourage potential researchers early in their careers.

In summary, few trainees select child and adolescent mental health as an area of research, and those who do find substantial obstacles to pursuing a research career in that field. Changes are needed to create viable research careers in this field and to enhance training opportunities for such careers.

NIMH should give the highest priority to supporting well-trained researchers at the

beginning of their careers to encourage them to establish research programs within an academic setting. Mechanisms for support must provide realistic stipends to free young researchers from clinical or teaching responsibilities, help them acquire necessary research facilities and equipment, and enable them to obtain additional research skills.

As such career pathways become available, training programs will need to expand. Equitable stipends as well as financial incentives will be essential. Investments in research personnel and the resources needed for research excellence are essential to assure advances in understanding, treating, and preventing child and adolescent mental disorders. Realization of the enormous potential for such advances hinges on the capacity to encourage bright, appropriately trained investigators to devote themselves to the field.

Section 6

Research Dissemination and Advocacy for Child and Adolescent Mental Health

Significantly improving the mental health of children and adolescents in our Nation will require a national effort that includes the NIMH research agenda outlined in this plan. The concerted and unified efforts of many public and private organizations will be needed to assure that:

1) Adequate human and financial resources are made available on a long-term basis to guarantee full implementation of the plan;

2) Current and emerging research-based knowledge relevant to the diagnosis, treatment, and prevention of child and adolescent mental disorders is disseminated to all segments of society--both professional and lay--who can use it to benefit the mental health of children and adolescents;

3) The mental health care system and the health, education, welfare, and justice systems closely intertwined with it are organized and funded in ways that enhance the mental health of children and enable all children and their families access to needed preventive, therapeutic, educational, and rehabilitative services.

This plan focuses primarily upon opportunities for NIMH-sponsored research. However, we will highlight below some of the key issues that fall within the NIMH sphere of responsibility for encouraging research and its dissemination and for providing national mental health leadership.

Public Education and Research Dissemination

Reducing the prevalence of mental disorders among children and adolescents in our country requires that hard-won gains in scientific knowledge about these disorders be translated, wherever practicable, into the day-to-day practices of those who directly or indirectly affect the well-being of our youth. The potential audience for such information--properly assessed and targeted--is huge.

The lay audience includes youngsters themselves and their parents and other family members (especially those potentially or directly affected by such disorders), policymakers, preschool and school personnel, juvenile judges, and others who deal extensively with youths. The professional audience includes clinicians in the core mental health disciplines as well as those in allied professions, especially family medicine practitioners, pediatricians, pediatric nurses, and social

workers in various settings not primarily focused on mental health.

Lay Audiences

Many information sources, both formal and informal, suggest that the general public is inadequately informed--and often misinformed--about mental disorders of children and adolescents. This lack of knowledge contributes to stigmatization of individuals with mental disorders, underrecognition of illness, underutilization of services, and lack of support for adequate funding of services.

It can also contribute inadvertently to the creation of public policies and practices that do not promote the best interests of children and adolescents with mental disorders and their families. An uninformed and sometimes misinformed public is unlikely to press for research or essential services addressed to mental health problems that some view as transitory, trivial, or lacking a scientific foundation. The chain of underrecognition and underfunding needs to be broken. One of the first points of intervention is through public education efforts.

Efforts must be made to close the knowledge gap, especially in view of the progress expected to result from intensified research in this field. NIMH can play an important role in fostering public understanding through its own public education and dissemination activities--which should be expanded. The Institute should also assume a leadership role in galvanizing, organizing, and collaborating with the educational activities of advocacy groups at the national, regional, and local levels.

NIMH should search for successful models of such collaborations, particularly among other Federal agencies such as the National Cancer Institute and the National Heart, Lung, and Blood Institute. It should also examine its own programs, such as the public education component of the NIMH Depression Awareness, Recognition, and Treatment (D/ART) program, as models for public education related to child and adolescent disorders.

Both the public education approaches used and the specific messages and media adopted (including but not limited to print) should be targeted to specific audiences, including non-English-speaking populations. Messages should reflect, but not overstate, the overall state of knowledge development in the field. In any consideration of potential target audiences, the parents of children with diagnosed mental disorders, as well as the parents of children at high risk for such disorders, should be given priority. Older children and teenagers, particularly those at risk for mental disorders, should also be considered a high-priority target audience. Special attention should be given to educating mass-media representatives, who can play a key role in public education efforts.

Professional Audiences

Many of the issues discussed above also apply to professional education. There is ample evidence that many professionals who deal extensively with young people--even some mental health professionals--are not adequately informed about current research findings concerning child and adolescent disorders.

In part, this situation may reflect the relatively early stage of development of the child and adolescent mental health research field itself, which in many critical areas has not evolved sufficiently to yield definitive guidance for practitioners. However, it may also reflect a lack of focused, ongoing effort to identify and disseminate those findings that are ready for practical clinical application.

Again, NIMH can and should play an important leadership role in developing ongoing mechanisms for assessing and disseminating

research to relevant professionals, and should work closely with professional organizations to develop source materials and curricula for undergraduate, graduate, and continuing education..

The professional education component of the NIMH D/ART program may provide a model for disseminating information to health and mental health practitioners about selected disorders of children and adolescents. In addition, mechanisms such as the NIH Consensus Development Conferences should be considered as possible vehicles for evaluating and disseminating research-based information about clinical care to practitioners.

Wherever possible, NIMH should attempt to base its public and professional educational activities on evaluated models of effective dissemination and education. Further, it should attempt to add to that body of knowledge by building an evaluative component into its own dissemination activities and those it supports.

ADVOCACY

The existence of a strong network of organizations concerned with the mental health and the well-being of children and adolescents offers NIMH many opportunities to create "multiplier" effects for its own research dissemination and advocacy activities. As noted above, NIMH should consider ways to foster information exchanges with and among such organizations--as was done in the development of this plan--to promote public and professional education and reduce stigma concerning child and adolescent mental disorders.

The Institute should examine potential mechanisms through which it can keep these important allies informed about overall research advances in the field, emerging areas of new knowledge, and initiatives relevant to the interests of specific groups and coalitions.

Through such exchanges, NIMH can remain attuned to information needs and knowledge gaps in the field, as well as specific research needs as perceived by parents, clinicians, and advocates of child and adolescent mental health. The sensitivity of many of these organizations to the perspectives of consumers and to the strengths and failings of the mental health service delivery system at local, State, regional, and national levels can be particularly valuable in identifying important issues for service systems research. Through the advocacy and dissemination activities of these organizations, NIMH can also find a useful vehicle for encouraging the adoption of successful innovations in service delivery that have been well assessed through research.

Section 7

Moving Forward: NIMH Budget and Administrative Recommendations

To accelerate the pace of progress in understanding and controlling the mental disorders that threaten or afflict a sizeable proportion of children and adolescents in our Nation, we recommend a strategy that focuses on three key goals:

- encouraging and supporting research on child and adolescent mental disorders at the forefront of scientific inquiry;

- developing attractive careers in child and adolescent mental health research and thus, an expanding supply of well-trained researchers; and

- enhancing the ability of NIMH to provide sustained leadership in this field and to encourage public and professional awareness and application of research advances related to child and adolescent mental disorders.

NIMH should assume a leadership role in implementing this comprehensive National Plan for Research on Child and Adolescent Mental Disorders, which is intended to be capacity-building in nature, setting the stage for a major expansion of this field of scientific inquiry. Specifically, NIMH should:

- increase funding--including support for individual project, program project, and center grants--for extramural child- and adolescent-related research in the areas of epidemiology; assessment, diagnosis, and treatment; prevention and special populations; services research and systems of care; basic behavioral and social sciences; and basic and clinical neuroscience. The NIMH Intramural Research Program should be funded to include an expanded focus on child and adolescent mental disorders;

- provide support and incentives at each stage of career development, including research training and career stability, for an expanded pool of research scientists;

- establish an Institute-wide consortium concerned with child and adolescent mental health research to implement this National Plan.

BUDGET RECOMMENDATIONS

As outlined in Table 1, we propose a 5-year plan of growth for NIMH (FY 1991-FY 1995) in its research, research training, and research dissemination activities related to child and adolescent mental disorders. The overall cost estimates assume a phasing-in of expenditures, after an initial surge of increased support to meet the most pressing needs within the field.

These figures include FY 1990 expenditures as well as proposed additions that could be used immediately or very soon. The recommended amounts include both direct and indirect costs, and are expressed in 1990 dollars; recommended budgets for future years will need to be corrected for inflation. The details of the proposed budget are illustrative rather than definitive. Actual appropriations received and research opportunities will determine how appropriated funds are apportioned.

The first year (FY 1991) would focus on taking advantage of missed research opportunities in the field of child and adolescent mental health research due to recent lack of funding. It would build the necessary infrastructure for growth, and would support research training and career development to ensure a cadre of researchers in the future. In the subsequent 4 years, annual funding growth would be modest.

We believe these budget recommendations are a reasoned response to the needs and research opportunities within the field of child and adolescent mental health. Proposed allocations for each area represent the consensus of the National Advisory Mental Health Council and are consistent with the recommendations of the Institute of Medicine (IOM) Committee. They were based on information provided by researchers across the entire field and on data from NIMH about the extent of the shortfall of resources available in each area to fund meritorious proposals.

We recommend that this funding be added to other growth in the NIMH budget, since we support the conclusion of an earlier IOM report that overall funding for mental health research remains low. Moreover, other parts of the mental health field would also benefit considerably from progress in many of the areas of research opportunity identified in this plan.

Overarching recommendations related to the 5-year support plan are discussed below, followed by more specific recommendations related to the major areas outlined in Table 1.

General Recommendations

As the preceding sections document, all areas of research in the field of child and adolescent mental health deserve substantial and sustained NIMH support. Individual project grants--the primary funding mechanism for NIMH research--need to be expanded considerably. For most areas of research within the NIMH purview, funding for individual project grants has been insufficient to take full advantage of the Nation's current research capacity.

Program project grants and multidisciplinary research center awards should also be used to move research ahead rapidly. A talented group of investigators committed to a specific area can act synergistically and maintain a high level of scientific productivity. This lesson is illustrated well by the success of such centers of excellence as the intramural research programs at the National Institutes of Health, the extramural Mental Retardation Centers sponsored by the National Institute of Child Health and Human Development, and the Mental Health Clinical Research Centers sponsored by NIMH. In the child and adolescent mental health field, such centers would provide important sites for research training,

Table 1
RECOMMENDED NIMH BUDGET: NATIONAL PLAN FOR RESEARCH ON CHILD AND ADOLESCENT MENTAL DISORDERS

Program	FY 1990 Current (Millions)	FY 1991 First Yr. (Millions)	FY 1992 Second Yr. (Millions)	FY 1993 Third Yr. (Millions)	FY 1994 Fourth Yr. (Millions)	FY 1995 Fifth Yr. (Millions)
I. Clinical Research	40	60	75	85	93	101
II. Basic Research	33	53	68	78	86	94
III. Research on Services	7	12	17	20	23	26
IV. Research Career Development and Research Training Support	6	16	26	31	35	39
V. NIMH Intramural Program	6	11	16	18	20	22
VI. Dissemination of Scientific Knowledge	0.3	0.5	0.7	0.9	1.1	1.3
TOTAL	$92.3	$152.5	$202.7	$232.9	$258.1	$283.3

offer pathways for career development, and create unique opportunities for multidisciplinary research. Support for bed costs must be included for those centers involved in hospital-based research.

Some specific scientific domains that could benefit immediately from the creation of multidisciplinary clinical research centers include:

- Research on the etiology, evaluation, and treatment of particular disorders or classes of disorder, such as schizophrenia, manic-depressive illness, conduct disorder, or autism;

- Longitudinal research focused on the mechanisms that underlie specific risk and protective factors or on certain catastrophic outcomes such as suicide or homicide;

- Research on the development of valid and reliable assessment instruments for use in epidemiological or clinical studies;

- Efforts to develop safe and reproducible approaches to treatment; and

- Intensive exploration of community-based interventions and service delivery systems.

Multidisciplinary research centers in the basic behavioral and biological sciences that are engaged in work related to child and adolescent mental disorders should also be supported.

We recommend that NIMH foster the development of informal research colloquia to be convened on a regular basis to review scientific progress in several areas, including:

- Epidemiology, to review progress in the assessment of children and adolescents, using standardized techniques suitable for large-scale multi-site studies;

- Treatment research, to review evidence concerning the potential value of combined treatments for specific disorders;

- Prevention research, to review progress in defining the mechanisms associated with specific risk and protective factors and to consider small- and large-scale collaborative early-intervention studies;

- Basic biological and behavioral research, to review progress on fundamental mechanisms relevant to mental disorders and to consider new assessment techniques that might be useful in clinical research on these disorders;

- Services research, to review progress in developing and assessing effective systems of care for mental health service delivery to children and adolescents with mental disorders.

There is abundant evidence that many investigators would apply themselves to new areas of research if funding were available. There are more than 15,000 neuroscientists and 22,000 research psychologists in the United States, to mention but two of the specialty areas germane to mental disorders of children and adolescents from which research scientists could be drawn.

Stability of funding has been a chronic concern over the past decade, with the typical grant now being funded for 3 years or less. We recommend strongly that, wherever possible, grants be funded for 5 years. We anticipate intense competition for the new funds proposed for this initiative. Such competition should have an extremely salutary effect on research.

Specific Recommendations

a. Clinical Research

Epidemiology: Progress has been rapid in recent years in the development and testing

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of the assessment techniques and survey instruments that are critical to epidemiological research. NIMH should foster further progress in the near future to permit substantial growth in knowledge of the prevalence, natural history, and course (treated and untreated) of mental disorders.

The establishment of research centers in epidemiology focusing specifically on issues related to the scope and magnitude of mental disorders in children and adolescents would be an important strategy to advance knowledge and training from a public health perspective. In addition, prevalence studies conducted in several locations would yield information on the frequency of specific disorders in the general population and would lay the groundwork for a future large-scale survey. Before beginning a national, coordinated, multi-site study of child and adolescent mental disorders, careful preparation is needed to develop the methods and procedures to be used.

Etiology, Assessment, Diagnosis, and Treatment: Although most research within these areas should be applied and clinical, basic investigations that are likely to affect future treatment and diagnosis should also be included. NIMH currently has four foci in these areas: affective and anxiety disorders; the disruptive behavior disorders (ADHD and the conduct disorders); autism and other developmental disorders; and special populations (focusing on the emotional and mental health problems of persons with mental retardation).

The creation of multidisciplinary research centers would facilitate integrative research that would be particularly valuable in the study of mental disorders of children and adolescents. Alternatively, funds could be used to support program project grants smaller than center grants that could enable investigators to attack particular problems from several perspectives.

Prevention: The broad area of prevention research encompasses clinical prevention of severe disorders, study of prevention strategies, and research on factors that place children and adolescents at risk for mental disorders. NIMH should expand such research, with special attention to potential interventions with very young children at risk. NIMH funding should also emphasize efforts to prevent clinical disorders in children who have been subjected to physical or sexual abuse and neglect, children of parents with mental disorders, and children at severe social disadvantage. The longitudinal perspective often required by prevention research necessitates stable funding over several years.

b. Basic Research

Behavioral and Social Sciences: Funding of basic behavioral and social science research requires increased support for individual research grants and for multidisciplinary research centers. Currently, there are no program projects and no multidisciplinary research centers in these basic research areas. We propose that NIMH establish two research centers or program projects in the first year of this plan, with two additional centers added, one in the third year and one in the fifth year.

Support of basic behavioral research that focuses on how human biology is changed by the psychosocial environment, and on the ways in which psychosocial and biological processes interact to affect behavior and health should be given immediate attention. This research includes areas such as developmental cognitive neurophysiology, social psychophysiology, psychoneuroimmunology, developmental behavioral genetics, and other sciences. Research in these areas often involves longitudinal, interdisciplinary studies and requires modernization of equipment and laboratories as well as stable funding. Such research has a real potential for knowledge development in the critically important areas

of cognitive and emotional disorders; factors affecting co-morbidity; control mechanisms of behavior; and the mechanisms underlying specific risk and protective factors in certain catastrophic outcomes such as suicide and homicide.

Antisocial and Violent Behavior: NIMH-supported research on the causes and consequences of antisocial and violent behavior deals with problems that have profound ramifications for society, such as delinquent and antisocial behavior as well as child abuse. We recommend strong NIMH support for research to develop better understanding of the etiology, course, correlates (psychosocial and biological risk factors), and mental health consequences of antisocial behavior in children and adolescents. NIMH should also respond to the critical need to develop and refine reliable and valid screening and assessment instruments that can be used for decisionmaking regarding children believed to be at high risk for serious abuse.

Minority Populations: Although problems of minorities are included in several of the research categories described in this plan, research that focuses specifically on this area is needed. Of particular interest is research dealing with the validity of various behavioral tests and assessment instruments for minority groups. We propose that research with a specific focus on minority children of younger ages be given special attention and support by NIMH. More support should also be given to studies of the mental health problems of youths in particular minority groups, such as Hispanic and Native American youths, and to mental health problems associated with childhood disorders in various minority groups.

Pediatric AIDS: The NIMH AIDS research program relevant to children and adolescents covers a broad spectrum of issues directly pertaining to mental and behavioral consequences of HIV infection and AIDS. It includes studies on brain and psychological factors associated with HIV infection in young people and their families, as well as studies on the prevention of HIV infection in women of childbearing age. This research program will potentially yield crucial information about biopsychosocial factors in AIDS and in HIV-infected young people and their caregivers, while providing vital knowledge of the most effective prevention approaches for dealing with this deadly illness. NIMH currently funds two AIDS research centers related to children and adolescents. We recommend the establishment of two additional research centers, as well as steady increases in overall support for this essential research area.

Basic Neuroscience: Developmental neuroscience encompasses those aspects of the brain-related sciences that relate most directly to mental disorders of children. The scientific promise of this area, the many neuroscientists with potential contributions to understanding child and adolescent mental disorders, and the fact that work could begin at once in a variety of disciplines and departments all argue eloquently for a marked increase in funding.

NIMH currently supports no program projects or center grants focused specifically on developmental neurobiology research. We recommend funding two such program projects or centers in the first year, and two additional centers, one in Year 3 and one in Year 5. There is a strong need to establish research centers that conduct neuroscience studies related to mental disorders of children and adolescents, and to support acquisition of state-of-the-art equipment for biological research in those laboratories. Such centers would facilitate interdisciplinary research on childhood disorders (and precursors of adult disorders) by bringing together basic neuroscientists and clinicians involved in biological investigation.

Brain-imaging techniques have immeasurably expanded the potential for studying brain

pathology noninvasively in children and adolescents with mental disorders. We propose that NIMH provide funds immediately to support collaborative research between existing imaging facilities and researchers studying child and adolescent mental disorders. A major portion of such collaborative studies should be devoted to developmental problems and to brain structure and function in child and adolescent mental disorders. The actual costs of establishing such centers undoubtedly would be higher than those projected in the plan, but they could be shared with other disciplines needing these research tools.

c. Research on Services and Systems of Care

NIMH has recently announced a new initiative that encourages research on mental health services provided to children and adolescents across a variety of settings, including hospitals, clinics, and schools. As noted earlier in this report, this initiative has generated an extremely encouraging response from the field. The impetus created by this new initiative should be sustained and the effort greatly expanded. Research on mental health services for children and adolescents is still meager, and there are still great gaps in scientific knowledge concerning current service needs and services, the adequacy and effectiveness of these services, and the best ways to finance them.

Other critically important services research issues include: the adequacy of clinical mental health services being provided to children and adolescents by psychiatrists and other physicians; the coordination of mental health services with other types of services (e.g., education, social services, welfare, juvenile justice); and the impact of model programs being introduced at various levels to improve the organization, financing, and delivery of child and adolescent mental health services across different community and institutional settings.

Of particular interest is services research related to homeless mentally ill children. In 1989, a new NIMH research initiative was started that focuses on homeless families with children and adolescents who are severely emotionally disturbed or at risk for emotional disorders. A major research aim of the initiative is to increase the effectiveness of clinical mental health services delivered to homeless mentally ill children, particularly minority and rural children. The research initiative has great potential for assisting health practitioners and clinicians in preventing the acceleration of mental disorders and severe emotional disturbance in homeless children and adolescents at greatest risk. We recommend a steady increase in NIMH support of the homeless research initiative during the 5 years of the plan.

Currently, no centers for research on mental health services to children and adolescents are being supported. These centers are greatly needed in a field that requires a multidisciplinary approach to answering questions about the delivery of mental health services to youth. Such centers can also serve as loci for much-needed programs of research training to increase the number of investigators with skills in child and adolescent mental health services research. In addition to supporting the establishment of new centers exclusively focused on mental health services research for children and their families, NIMH should supplement existing minority and services research centers to encourage their increased attention to issues related to child and adolescent mental health.

d. NIMH Intramural Research Program

One of the striking early successes of NIMH has been its stimulation of progress in the mental health field through vigorous intramural research in a range of basic and clinical areas. Increased funding of the NIMH Intramural Research Program should therefore be an integral part of the overall

effort to expand research concerning child and adolescent mental disorders.

We propose that, to complement efforts already in place, NIMH should establish very early in the implementation of this plan a new intramural clinical research unit that would focus on severe mental disorders of children and adolescents. NIMH should consider devoting this unit to research on children and adolescents suffering the mental health effects associated with mental retardation. As part of the same facility, NIMH should also establish a related basic science laboratory focused on developmental molecular neurobiology. Such intramural research programs might serve as national models.

e. Research Career Development and Research Training Support

Future progress in research depends on the recruitment, training, and retention of gifted scientists across a range of disciplines. In our view, the most pressing need is for support of well-trained and highly motivated scientists during the first decade of their research careers. Attrition at this stage is the most costly, and it is commonplace.

NIMH already has several excellent programs for fostering early experiences in research and promoting continued excellence, but these programs are seriously underfunded, both in terms of the maximum salary for investigators and in terms of total funding.

Moreover, explicit funding for researchers in child and adolescent mental health is essential and should receive immediate attention by NIMH.

Expanded and reliable support for new investigators, which uses all appropriate and available funding mechanisms, is vital to encourage and retain young scientists in the child and adolescent mental health field. In addition, the complex multidisciplinary character of contemporary science requires that the participation of all the disciplines relevant in the study of child and adolescent mental disorders be expanded. Thus, NIMH should facilitate research training in child psychiatry, pediatrics, developmental and clinical psychology, psychiatric nursing, psychiatric social work, and family medicine, as well as in developmental neuroscience and in other basic behavioral and social sciences.

A variety of approaches can be used, including undergraduate summer research, pre- and postdoctoral programs, M.D.-Ph.D. training programs, and special training opportunities for members of minority groups. Stipends should realistically reflect years of training and competing career pathways.

We urge that child and adolescent mental health research be declared a critical-shortage area, similar to AIDS research, so that trainees who enter the field can have all or part of their educational loans forgiven. In addition, institutional research training grants and center grants must provide for the real costs of teaching and monitoring trainees within these programs.

The failure to support a significant number of M.D.-Ph.D. students within the field of mental health generally has been a serious error--one that is just now being rectified by NIMH. We propose that students be allowed to apply to enter an M.D.-Ph.D. track with an emphasis on child and adolescent mental health in their first year of medical school. New positions each year should be available explicitly for research disciplines closely related to the study of child and adolescent mental disorders.

NIMH should also consider establishing a program for senior scientists that would include an explicit research training function. Such a program could provide unique opportunities for especially talented trainees to work with the best researchers in child and

adolescent mental health across the country, while also supporting and recognizing researchers who are an invaluable resource within the field.

To achieve growth in this field, the pool of potential trainees must be expanded. Attracting more talented students is not simply a matter of money. Means must be found to acquaint a broader audience of students with the importance of child and adolescent mental disorders, the burdens they impose, the urgent need for progress, and the exciting potential for scientific advances, particularly at the interface between disciplines.

More specifically, we recommend that NIMH sponsor scientific retreats or summer institutes in which prospective students or postdoctoral fellows would be able to interact with leading researchers in the field; NIMH should also fund longer term research opportunities for individuals in professional training. We urge, as well, the creation of NIMH-sponsored summer courses for research faculty. These are ideal vehicles for developing new ideas and initiating collaborative ventures based on the latest research findings.

NIMH should make a major effort to encourage recruitment of more researchers from minority groups. Efforts to diminish the suffering caused by many of the disorders of children or adolescents will depend on the development of treatment and prevention programs that are sensitive to cultural diversity and that address perceived community needs. The recruitment of minority researchers will aid in achieving these goals.

Dissemination of Scientific Knowledge

Significant gaps now exist in public and professional knowledge about child and adolescent mental disorders. NIMH should encourage the dissemination of research-based knowledge to lay and professional audiences to enhance understanding and utilization of research advances in the field, with particular attention to successful models of such dissemination, such as the NIMH D/ART program and the NIH Consensus Development Conferences. It should make special efforts to encourage information exchanges with advocacy organizations particularly concerned with child and adolescent mental health, with other Federal and State organizations, and with private foundations.

ADMINISTRATIVE RECOMMENDATIONS

An Institute-wide consortium concerned with child and adolescent mental health research should be established at NIMH under the direct guidance of the Director of NIMH. This group would have authority and responsibility for coordinating and stimulating child- and adolescent-related research programs across the Institute. The consortium would consist of appointed representatives from each of the major NIMH research divisions within the extramural program as well as representatives from intramural research. Representatives of the NIMH Division of Extramural Activities (which is charged with providing the initial scientific review of grant proposals) would also be included.

The consortium should address immediately the peer review of research proposals. Key concerns include the increased burden that implementation of this plan will place on the initial review procedures, and the fact that the current review process is very widely dispersed, with as many as 11 of the 20 Initial Review Groups involved in the process.

Given the need for capacity-building, innovative review procedures may be desirable. One approach would be to focus on areas of great need and high priority (such as center grants, longitudinal research, mental health services research, or research that requires a linkage between basic and clinical investigators). Several rounds of review might be

encouraged, with some incentive at each level. Such a system might solicit first a brief research prospectus from interested collaborative groups or individual investigators. The most promising of these would then be supported while a more detailed proposal was being prepared. A final round of review would then decide which specific programs to fund.

The consortium should address the acute need to assure that experts in child and adolescent mental disorders research are adequately represented in the peer review of proposals from the field. Some reorganization of the existing peer-review committee structure is likely to be required, possibly including the establishment of one or two research review committees for child and adolescent mental health.

Many of the new research initiatives will require detailed requests for applications and perhaps also separate review and funding arrangements to ensure that support is available for specific high-priority areas. For example, much care will need to be taken in developing a series of longitudinal studies, with special advisory boards and review committees being empaneled.

The NIMH consortium should assume a leadership role in advocating child and adolescent mental health research among the other Federal organizations whose activities are germane to the mental health and well-being of the Nation's children and adolescents. These would include the other ADAMHA institutes; the National Science Foundation; the National Institute of Child Health and Human Development; the National Institute of Neurological Disorders and Stroke; the Centers for Disease Control, and the Health Resources and Service Administration. Other relevant Federal organizations include the Administration for Children, Youth, and Families; the Bureau of National and Child Health; the Department of Education; the Health Care Financing Administration; and the Department of Justice. It will also be essential to involve State mental health agencies; NIMH will then be able to encourage interagency research on the mental health of children and adolescents.

This consortium may also wish to consider convening a meeting of many of the major private foundations concerned with this area of research to facilitate better communication and planning. A crucial consideration at these meetings would be long-range capacity--building. Historically the private sector has provided invaluable support and encouragement in this field. The William T. Grant Foundation, the Robert Wood Johnson Foundation, the Carnegie Corporation of New York, and, more recently, the John Merck Fund and the MacArthur Foundation deserve special recognition for their efforts on behalf of child and adolescent mental health research.

PROSPECT

Finally, we expect that implementation of this plan will reap benefits not only for all children who are or may be afflicted by mental disorders, but for their families and friends, and for society as a whole. The knowledge gained by implementing this plan will complement and be enhanced by efforts now underway in another major NIMH initiative: "The National Plan for Research on Schizophrenia and the Brain" (which combines "A National Plan for Schizophrenia Research" with the neuroscience initiative known as the "Decade of the Brain" plan).

Research on the complex origins of child and adolescent mental disorders--particularly studies focusing on developmental neurobiology and the genetic control of nervous system development--is likely to clarify the biological foundations of many mental disorders that primarily affect adults, including schizophrenia. Similarly, efforts at early detection and

treatment of psychopathology in young children, especially through longitudinal studies, may reveal risk factors for and predictors of disorders such as schizophrenia prior to the onset of clinical illness.

Conversely, research focused on understanding the causes and treatment of disorders found primarily among adults, such as studies being carried out through the National Plan for Research on Schizophrenia and the Brain, will provide invaluable fundamental insights, technological advances, and treatment approaches that can be applied to research and clinical care with younger populations. Thus, we expect these two major NIMH research initiatives to have synergistic effects in attracting talented researchers to the mental health field and in stimulating new ways to understand and overcome mental disorders in people of all ages.

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